University of Agriculture, Faisalabad

Bidding Documents

Tender No.130/2015

SPECIAL INSTRUCTIONS

- No cutting erasing is allowed in the Tender bid.
- Bid offered strictly in accordance with the bid document will only by accepted.
- Preferably type the tender detail in the bid offer.

Contents

Section I.

Invitation for Bids

UNIVERSITY OF AGRICULTURE, FAISALABAD
(TENDER NOTICE No.130/2015)

Sealed tenders are invited from Income Tax and Sales Tax Registered Firms on the basis of Single Stage (two envelop procedure) for purchase of Laboratory Equipment under project titled "Establishment of Punjab Bio-energy Institute (PBI), University of Agriculture, Faisalabad" for the laboratories of Punjab Bio-Energy Institute at University of Agriculture, Faisalabad.

Tender No.130/2015			
Date of Receiving and Opening	**14.12.2015**	**Receiving Time**	**11:00 a.m.**
		Opening Time	**11:30 a.m.**
		Bid Security	**2% of the quoted Value**
		Tender Fee	**Rs.500/-**

The bidding documents can be obtained from the Directorate of Procurement & Inventory Control on deposit of tender fee in the University Income Account (No.11-9/NBP, UAF Branch) after appearance of Tender Notice at respective mode of publication. The bidding documents can also be down loaded from UAF website www.uaf.edu.pk /Directorate of Procurement & Inventory Control (DPIC) after appearance of Tender Notice at respective mode of publication. In that case, please attach CDR/bank draft against the tender fee (Non Refundable) in favour of Director (DPIC) with the Technical Bid. For Cities other than Faisalabad add Rs.200/- in the Tender Fee amount.

DR. SHAHID AFZAL GILL
Director (DPIC)
(For & On behalf of the Committee)
Phone#041-9200898, 9200161 **Extn.**2208
E.Mail: *store_officer@uaf.edu.pk*
dpic@uaf.edu.pk

Section II.

Instructions to Bidders

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Instructions to Bidders

A. Introduction

1. Source of Funds

University of Agriculture, Faisalabad.

2. Eligible Bidders

2.1 The invitation for Bids is opened to all supplier having trade relations with Pakistan and registration for National Tax Number &Sales Tax Number with Federal Board of Revenue

2.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation for Bids.

2.3 Only Government owned enterprises may participate, only if they are legally allowed.

2.4 bidders shall not be under a declaration of ineligibility in accordance with ITB 36.1&37 by any Government organization. The bidder shall provide affidavit to this effect.

3. Eligible Goods and Services

3.1 All goods and related services to be supplied under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such goods and services.

3.2 For purposes of this clause, "origin" means the place where the goods are mined, grown, or produced, or the place from which the related services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially-recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

3.3 The origin of goods and services is distinct from the nationality of the Bidder.

4. Cost of Bidding

4.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Purchaser named in the bid date sheet, hereinafter referred to as "the purchaser" will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. The Bidding Documents

5. Content of Bidding Documents

5.1 The goods required, bidding procedures, and contract terms are prescribed in the bidding documents. In addition to the Invitation for Bids, the bidding documents include:

(a) Instructions to Bidders (ITB)

(b) Bid Data Sheet

(c) General Conditions of Contract (GCC)

(d) Special Conditions of Contract (SCC)

(e) Schedule of Requirements

(f) Technical Specifications

(g) Bid Form and Price Schedules

(h) Bank Guarantee Form if applicable

(i) Manufacturer's Authorization Form

(j) Integrity pact.

(k) Mechanism of Blacklisting and Deregistration

5.2 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or to submit a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in the rejection of its bid.

6. Clarification of Bidding Documents

6.1 A prospective Bidder requiring any clarification of the bidding documents may notify the Purchaser in writing at the Purchaser's address indicated in the **Bid Data Sheet.** The Purchaser will respond in writing to any request for clarification of the bidding documents which it receives prior to the deadline for the submission of bids prescribed in ITB Clause 19.1. Written copies of the Purchaser's response (including an explanation of the query but without identifying the source of inquiry) will be sent to all prospective bidders that have received the bidding documents.

7. Amendment of Bidding Documents

7.1 At any time prior to the deadline for submission of bids, the Purchaser, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the bidding documents by amendment.

7.2 All prospective bidders that have received the bidding documents will be notified of the amendment in writing and will be binding on them.

7.3 In order to allow prospective bidders reasonable time in which to take the amendment into account in preparing their bids, the

Purchaser, at its discretion, may extend the deadline for the submission of bids.

C. Preparation of Bids

8. Language of Bid

8.1 The bid prepared by the Bidder, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser shall be written in English. Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified above**,** in which case, for purposes of interpretation of the Bid, the translation shall govern.

9. Documents Constituting the Bid

9.1 The bid prepared by the Bidder shall comprise the following components:

(a) a Bid Form and a Price Schedule completed in accordance with ITB Clauses 10, 11, and 12;

(b) documentary evidence established in accordance with ITB Clause 13 that the Bidder is eligible to bid and is qualified to perform the contract if its bid is accepted;

(c) documentary evidence established in accordance with ITB Clause 14 that the goods and ancillary services to be supplied by the Bidder are eligible goods and services and conform to the bidding documents; and

(d) bid security furnished in accordance with ITB Clause 15.

10. Bid Form

10.1 The Bidder shall complete the Bid Form and the appropriate Price Schedule furnished in the bidding documents, indicating the goods to be supplied, a brief description of the goods, their country of origin, quantity, and prices.

10.2 Bidders tendering for engineering goods produced in Pakistan shall be accorded a price preference in rupees up to a specific percentage (in proportion to the value addition) of the lowest quoted landed cost of an item of foreign origin with similar specifications as mentioned in the tenders:

(1) Provided that-

(a) The saving in foreign exchange is not less than the amount of price preference: and

(b) It is ensured that in each case of such preference, the total import requirements for producing the supplies tendered for locally manufactured items has been duly indicated by the bidders.

(2) Price preference shall be allowed as under:-

(a) Having minimum of twenty percent value addition through indigenous manufacturing price preference shall fifteen percent;

(b) Having over twenty percent and up to thirty percent value addition through indigenous manufacturing, price preference shall be twenty percent, and

(c) Having over thirty percent value addition through indigenous manufacturing, price preference shall be twenty five percent.

(3) For the purpose of granting a margin of domestic preference bids will be classified into following groups.

Group.A. Bids offering engineering goods produced in Pakistan.

Group.B. Bids offering good of foreign origin to be imported by the purchaser through the supplier's Local (Pakistan) Agent.

Group.C. Bids offering good of foreign origin to be imported by the purchaser directly.

11. Bid Prices

11.1 The Bidder shall indicate on the appropriate Price Schedule the unit prices (where applicable) and total bid price of the goods it proposes to supply under the contract.

11.2 Prices indicated on the Price Schedule shall be entered separately in the following manner or specified otherwise in the Bid Data Sheet:-

a). for goods offered from within Pakistan;

the price shall be quoted on FOR UAF basis. (FOR means the price of goods quoted by the bidder shall be inclusive of all costs, expenses, charges, duties and taxes etc. whatsoever incidental to their delivery, installation and commissioning as the case may be at UAF site).

b). for goods offered from abroad by the local agent of Pakistan:

the price shall be quoted on Free in Stores Plus (FIS+) UAF basis. (FIS+ means the price of goods quoted by the bidder shall be inclusive of all domestic and abroadcosts, expenses, charges, duties and taxes etc.

whatsoever except customs duty and of the Pakistanincidentalto their delivery installation/commissioning at UAF site). The bidder, in quoting the price, shall be free to use transportation in abroad other than Israel.

c) for goods offered from abroad by the foreign principal directly:

the price shall be quoted CFR/CPT Karachi seaport or Lahore airport Pakistan, as the case may be. The bidder shall also add all cost expenses, charges, duties and taxes etc. whatsoever expect customs duties, incidental to delivery installation/commissioning of goodsfrom the port of destinationto UAF site. The bidder, in quoting the price, shall be free to use transportation in abroad other than Israel.

11.3 The terms CFR, CPT, etc., shall be governed by the rules prescribed in the current edition of *Incoterms* published by the International Chamber of Commerce, Paris or otherwise specified in the Bid Data Sheet and SCC

11.4 The Bidder's separation of price components in accordance with ITB Clause 11.2 above will be solely for the purpose of facilitating the comparison of bids by the Purchaser and will not in any way limit the Purchaser's right to contract on any of the terms offered.

11.5 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account, unless otherwise specified in the Bid Data Sheet. A bid submitted with an adjustable price quotation will be treated as non-responsive and will be rejected, pursuant to ITB Clause 24. If, however, in accordance with the Bid Data Sheet, prices quoted by the Bidder shall be subject to adjustment during the performance of the contract, a bid submitted with a fixed price quotation will not be rejected, but the price adjustment would be treated as zero.

12. Bid Currencies

12.1 Prices shall be quoted in the following currencies:

(a) For goods and services that the Bidder will supply from within the Purchaser Country, the prices shall be quoted in Pak Rupees, unless otherwise specified in the **Bid Data Sheet.**

(b) For goods and services that the Bidder will supply from outside the Purchaser Country, the prices shall be quoted in any currency. However the payment will only be made by the purchaser in pak rupees in case of ITB clause 11.2 (b) and SCC.

13. Documents Establishing Bidder's Eligibility and Qualification

13.1 Pursuant to ITB Clause 9, the Bidder shall furnish, as part of its bid, documents establishing the Bidder's eligibility to bid and its qualifications to perform the contract if its bid is accepted.

13.2 The documentary evidence of the Bidder's eligibility to bid shall establish to the Purchaser's satisfaction that the Bidder, at the time of submission of its bid, is from an eligible country as defined under ITB Clause 2.

13.3 The documentary evidence of the Bidder's qualifications to perform the contract if its bid is accepted shall establish to the Purchaser's satisfaction:

(a) that, in the case of a Bidder offering to supply goods under the contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' Manufacturer or producer to supply the goods in the Purchaser Country;

(b) that the Bidder has the financial, technical, and production capability necessary to perform the contract;

(c) that, in the case of a Bidder not doing business within the Purchaser Country, the Bidder is or will be (if awarded the contract) represented by an Agent in that country equipped and able to carry out the Supplier's maintenance, repair, and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications; and

(d) that the Bidder meets the qualification criteria listed in the **Bid Data Sheet.**

14. Documents Establishing Goods' Eligibility and Conformity to Bidding Documents

14.1 Pursuant to ITB Clause 9, the Bidder shall furnish, as part of its bid, documents establishing the eligibility and conformity to the bidding documents of all goods and services which the Bidder proposes to supply under the contract.

14.2 The documentary evidence of the eligibility of the goods and services shall consist of a statement in the Price Schedule of the country of origin of the goods and services offered which shall be confirmed by a certificate of origin issued at the time of shipment.

14.3 The documentary evidence of conformity of the goods and services to the bidding documents may be in the form of literature, drawings, and data, and shall consist of:

(a) a detailed description of the essential technical and performance characteristics of the goods;

(b) a list giving full particulars, including available sources and current prices of spare parts, special tools, etc.,

necessary for the proper and continuing functioning of the goods for a period to be specified in the **Bid Data Sheet,** following commencement of the use of the goods by the Purchaser; and

(c) an item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications.

14.4 For purposes of the commentary to be furnished pursuant to ITB Clause 14.3(c) above, the Bidder shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Purchaser in its Technical Specifications, are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names, and/or catalogue numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

15. Bid Security

15.1 Pursuant to ITB Clause 9, the Bidder shall furnish, as part of its bid, a bid security @ 2% of the quoted value or in the amount specified otherwise in the **Bid Data Sheet.**

15.2 The bid security is required to protect the Purchaser against the risk of Bidder's conduct which would warrant the security's forfeiture, pursuant to ITB Clause 15.7.

15.3 The bid security shall be denominated in the currency of the bid or in another freely convertible currency, and shall be in one of the following forms:

(a) Call deposit receipt (CDR).

15.4 Any bid not secured in accordance with ITB Clauses 15.1 and 15.3 will be rejected by the Purchaser as nonresponsive, pursuant to ITB Clause 24.

15.5 Unsuccessful bidders' bid securities will be discharged or returned as promptly as possible but not later than thirty (30) days after the expiration of the period of bid validity prescribed by the Purchaser pursuant to ITB Clause 16.

15.6 The successful Bidder's bid security will be discharged upon the Bidder signing the contract, pursuant to ITB Clause 34, and furnishing the performance security, pursuant to ITB Clause 35.

15.7 The bid security may be forfeited:

(a) if a Bidder:

(i) withdraws its bid during the period of bid validity specified by the Bidder on the Bid Form, or

(ii) does not accept the correction of errors pursuant to ITB Clause 24.2; or

(b) in the case of a successful Bidder, if the Bidder fails:

(i) to sign the contract in accordance with ITB Clause 34; or

(ii) to furnish performance security in accordance with ITB Clause 35.

16. Period of Validity of Bids

16.1 Bids shall remain valid for the period specified in the **Bid Data Sheet** after the deadline date of bid submission prescribed by the Purchaser, pursuant to ITB Clause 19. A bid valid for a shorter period shall be rejected by the Purchaser as nonresponsive.

16.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. The bid security provided under ITB Clause 15 shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.

17. Format and Signing of Bid

17.1 The Bidder shall prepare an original bid indicated in the **Bid Data Sheet,** clearly marking each "TECHNICAL BID" and "FINANCIAL BID," as appropriate. In the event of any discrepancy between them, the original shall govern.

17.2 The original bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the contract. All pages of the bid, except for unamended printed literature, shall be initialed by the person or persons signing the bid.

17.3 Any interlineations, erasures, or overwriting shall be valid only if they are initialed by the person or persons signing the bid.

17.4 The Bidder shall furnish information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid to agents relating to this Bid, and to contract execution if the Bidder is awarded the contract.

D. Submission of Bids

18. Sealing and Marking of Bids

18.1 The Bidder shall seal the Technical and Financial Bid in separate envelopes, duly marking the envelopes as "TECHNICAL" and "FINANCIAL." The envelopes shall then be sealed in an outer envelope.

18.2 The inner and outer envelopes shall:

(a) be addressed to the Purchaser at the address given in the **Bid Data Sheet;** and

(b) bear the Project name indicated in the Bid Data Sheet, the Invitation for Bids (IFB) title and number indicated in the Bid Data Sheet, and a statement: "DO NOT OPEN BEFORE," to be completed with the time and the date specified in the **Bid Data Sheet,** pursuant to ITB Clause 22.1.

18.3 The inner envelopes shall also indicate the name and address of the Bidder to enable the bid to be returned unopened in case it is declared "late."

18.4 If the outer envelope is not sealed and marked as required by ITB Clause 18.2, the Purchaser will assume no responsibility for the bid's misplacement or premature opening.

19. Deadline for Submission of Bids

19.1 Bids must be received by the Purchaser at the address specified under ITB Clause 18.2 (a) not later than the time and date specified in the **Bid Data Sheet.**

19.2 The Purchaser may, at its discretion, extend this deadline for the submission of bids by amending the bidding documents in accordance with ITB Clause 7, in which case all rights and obligations of the Purchaser and bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

20. Late Bids

20.1 Any bid received by the Purchaser after the deadline for submission of bids prescribed by the Purchaser pursuant to ITB Clause 19 will be rejected and returned unopened to the Bidder.

21. Modification and Withdrawal of Bids

21.1 The Bidder may modify or withdraw its bid after the bid's submission, provided that written notice of the modification, including substitution or withdrawal of the bids, is received by the Purchaser prior to the deadline prescribed for submission of bids.

21.2 The Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of ITB Clause 18. A withdrawal notice may also be sent by fax, but followed by a signed confirmation copy, postmarked not later than the deadline for submission of bids.

21.3 No bid may be modified after the deadline for submission of

bids.

21.4 No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid Form. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its bid security, pursuant to the ITB Clause 15.7.

E. Opening and Evaluation of Bids

22. Opening of Bids by the Purchaser

22.1 The Purchaser will open all bids in the presence of bidders' representatives who choose to attend, at the time, on the date, and at the place specified in the **Bid Data Sheet.** The bidders' representatives who are present shall sign a register evidencing their attendance.

22.2 The bidders' names, bid modifications or withdrawals, bid prices, discounts, and the presence or absence of requisite bid security and such other details as the Purchaser, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for late bids, which shall be returned unopened to the Bidder pursuant to ITB Clause 20.

22.3 Bids (and modifications sent pursuant to ITB Clause 21.2) that are not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

22.4 The Purchaser will prepare minutes of the bid opening.

23. Clarification of Bids

23.1 During evaluation of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing, and no change in the prices or substance of the bid shall be sought, offered, or permitted.

24. Preliminary Examination

24.1 The Purchaser will examine the bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

24.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail. If the Supplier does not accept the correction of the errors, its bid will be rejected, and its bid

security may be forfeited.

24.3 The Purchaser may waive any minor informality, nonconformity, or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

24.4 Prior to the detailed evaluation, pursuant to ITB Clause 26, the Purchaser will determine the substantial responsiveness of each bid to the bidding documents. For purposes of these Clauses, a substantially responsive bid is one which conforms to all the terms and conditions of the bidding documents without material deviations. Deviations from, or objections or reservations to critical provisions, **such as** those concerning Bid Security (ITB Clause 15), Applicable Law (GCC Clause 31), and Taxes and Duties (GCC Clause 33), will be deemed to be a material deviation. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

24.5 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

25. Conversion to Single Currency

25.1 To facilitate evaluation and comparison, the Purchaser will convert all bid prices expressed in the amounts in various currencies in which the bid prices are payable to either:

(a) Purchaser Country at the selling exchange rate established for similar transactions by the State Bank of Pakistan and National Bank of Pakistan or specified otherwise;

25.2 The currency selected for converting bid prices to a common base for the purpose of evaluation is Pak Rupees to be converted as per rate of the bank shown in ITB 25.1 (a) on the date of opening of the financial bid or specified otherwise in the **Bid Data Sheet.**

26. Evaluation and Comparison of Bids

26.1 The Purchaser will evaluate and compare the bids which have been determined to be substantially responsive, pursuant to ITB Clause 24.

26.2 The Purchaser's evaluation of a bid will take into account, in addition to the bid price quoted in accordance with ITB Clause 11.2, one or more of the following factors as specified in the **Bid Data Sheet,** and quantified in ITB Clause 26.3:

(a) delivery schedule offered in the bid;

(b) deviations in payment schedule from that specified in the Special Conditions of Contract;

(c) the cost of components, mandatory spare parts, and service;

(d) the availability in the Purchaser's country of spare parts and after-sales services for the equipment offered in the bid;

(e) the projected operating and maintenance costs during the life of the equipment;

(f) the performance and productivity of the equipment offered; and/or

(g) other specific criteria indicated in the **Bid Data Sheet** and/or in the Technical Specifications.

26.3 For factors retained in the Bid Data Sheet pursuant to ITB 26.2, one or more of the following quantification methods will be applied, as detailed in the Bid Data Sheet:

(a) *Delivery schedule.*

(i) The goods covered under this invitation are required to be delivered (shipped) within an acceptable range of weeks specified in the Schedule of Requirement. No credit will be given to earlier deliveries, and bids offering delivery beyond this range will be treated as nonresponsive. Within this acceptable range, an adjustment per week, as specified in the **Bid Data Sheet,** will be added for evaluation to the bid price of bids offering deliveries later than the earliest delivery period specified in the Schedule of Requirements.

(b) *Deviation in payment schedule.*

(i) The SCC stipulates the payment schedule offered by the Purchaser. If a bid deviates from the schedule it will be considered as non-responsive bid.

(c) *Cost of spare parts.*

(i) The list of items and quantities of major assemblies, components, and selected spare parts, likely to be required during the initial period of operation shall be specified by the bidder. The total cost of these items, at the unit prices quoted in each bid, will be added to the bid price.

or

(ii) The bidder will draw up a list of high-usage and high-value items of components and spare parts, along with estimated quantities of usage in the initial period of operation. The total cost of these items and quantities will be computed from spare parts unit prices submitted by the Bidder and added to the bid price.

(d) *Spare parts and after sales service facilities in the Purchaser's country.*

The cost to the Purchaser of establishing the minimum service facilities and parts inventories, if outlined in the **Bid Data Sheet** or elsewhere in the bidding documents, if quoted separately, shall be added to the bid price.

(e) *Operating and maintenance costs.*

Since the operating and maintenance costs of the goods under procurement form a major part of the life cycle cost of the equipment, these costs will be evaluated in accordance with the criteria specified in the **Bid Data Sheet** or in the Technical Specifications.

(f) *Performance and productivity of the equipment.*

(i) Goods offered shall have a minimum productivity specified under the relevant provision in the Technical Specifications to be considered responsive. Evaluation shall be based on the cost per unit of the actual productivity of goods offered in the bid or otherwise specified in the **Bid Data Sheet** or in the Technical Specifications.

(g) *Specific additional criteria*

Other specific additional criteria to be considered in the evaluation and the evaluation method shall be detailed in the **Bid Data Sheet** and/or the Technical Specifications.

26.4. **Delivery Schedule.**

As mentioned in Bid Data Sheet.

27. Domestic Preference

27.1 If the **Bid Data Sheet** so specifies, the Purchaser will grant a margin of preference to goods manufactured in the Purchaser's country for the purpose of bid comparison, in accordance with the procedures outlined in subsequent paragraphs, provided the Bidder shall have established to the satisfaction of the Purchaser that its bid complies with the criteria specified in ITB Clause 10.2 (a):

27.2 The Purchaser will first review the bids to confirm the appropriateness of, and to modify as necessary, the bid group classification to which bidders assigned their bids in preparing their Bid Forms and Price Schedules, pursuant to ITB Clauses 10 and 11.

27.3 All evaluated bids in each group will then be compared among themselves to determine the lowest evaluated bid of each group. The lowest evaluated bid of each group will next be compared with the lowest evaluated bids of the other groups. If this comparison results in a bid from Group A or Group B being the lowest, it will be selected for contract award.

27.4 If, as a result of the preceding comparison, the lowest evaluated bid is from Group C, all Group C bids will then be further compared with the lowest evaluated bid from Group A, after adding to the evaluated bid price of the imported goods offered in each Group C bid, for the purpose of this further comparison only:

(a) the amount of customs duties and other import taxes that a nonexempt importer would have to pay for the importation of goods offered in each Group C bid;

If the Group A bid in the further comparison is the lowest, it will be selected for award. If not, the lowest evaluated bid from Group C, as determined from the comparison under ITB Clause 27.3 above, will be selected for award.

28. Contacting the Purchaser

28.1 From the time of bid opening to the time of contract award, if any bidder wishes to contact the Purchaser on any matter related to the bid, it should do so in writing.

28.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison, or contract award may result in the rejection of the Bidder's bid.

F. Award of Contract

29. Post-

29.1 In the absence of prequalification, the Purchaser will determine

qualification

to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clause 13.3.

29.2 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 13.3, as well as such other information as the Purchaser deems necessary and appropriate.

29.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid, in which event the Purchaser will proceed to the next lowest evaluated bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.

30. Award Criteria

30.1 Subject to ITB Clause 32, the Purchaser will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

31. Purchaser's Right to Vary Quantities at Time of Award

31.1 The Purchaser reserves the right at the time of contract award to increase or decrease, as per requirement**,** the quantity of goods and services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions.

32. Purchaser's Right to Accept Bid and to Reject All Bids

32.1 The Purchaser reserves the right to accept bid and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to the affected Bidder or bidders.

33. Notification of Award

33.1 Prior to the expiration of the period of bid validity, the Purchaser will notify/inform the successful and unsuccessful Bidder in writing by letter or by Fax/ e-mail, or telephonically, that its bid has been accepted and unaccepted as the case may by.

33.2 The notification of award will constitute the formation of the Contract.

33.3 Upon the successful Bidder's furnishing of the performance security pursuant to ITB Clause 35, the Purchaser will discharge bid security to each unsuccessful Bidder on his written request, pursuant to ITB Clause 15.

33.4 If, after notification of award, a Bidder wishes to ascertain the grounds on which its bid was not selected, it should address its request to the Purchaser. The Purchaser will promptly respond in writing to the unsuccessful Bidder.

34. Signing of Contract

34.1 After 10 days from the announcement of evaluation report, the Purchaser will send supply order or Formal Contract as the case may be to successful bidder. In case of formal contract, the successful bidder will send back the contract to the purchaser duly signed within 7 days from the issuance date. Failing which the Purchaser reserves the right under ITB Clause 15.7.

35. Performance Security

35.1 Within Seven (07) days from the issuance of acceptance letter from the Purchaser, the successful Bidder shall furnish the performance security in shape of CDR or Bank guarantee at the discretion of the Purchaser. In case the amount of bid security is equal or greater than the value of the goods to be supplied then the bidder shall not require furnishing the performance security separately, it will be retained or deducted from the bidder's claim on bidder's choice.

35.2 Failure of the successful Bidder to comply with the requirement of ITB Clause 34.2 or ITB Clause 35.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the Purchaser may make the award to the next lowest evaluated Bidder or call for new bids.

36. Corrupt or Fraudulent Practices

36.1 The purchaser as well as Bidders/Suppliers/Contractors should observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the PPRA Govt. of the Punjab;

(a) the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;

(b) The purchaser will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) The Purchaser will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a University Contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a University Contract.

36.2 Furthermore, Bidders shall be aware of the provision stated in Clauses 5.4 and 24.1 of the General Conditions of Contract.

37.**Blacklisting/Deregistration** 37.1 the Purchaser reserves the right to blacklist or deregister (may impose Permanent or temporary bar for participation in the procurement proceedings respectively) the bidder as follows:-

(a) **Blacklisting:**The bidder who

(i) Fail to perform contractual obligations or the performance under the contract is not upto the mark;
(ii) Found to be indulging in corrupt or fraudulent practices;
(iii) Commit an action causing or liable to cause loss to the University;
(iv) Furnish false information;

(b) **Deregistration:**The bidder who

(i) Submit bid as employee of the firm, or proprietor or shareholder being an employee of the University:
(ii) Show non-responsive attitude in case of summoning by the University.

(iii) Back out from their offers after opening of tender;
(iv) Misbehave with the University employee;

37.2 The bidder shall provide affidavit that the firm was not declared blacklisted or deregistered by any of the Federal and Provincial Government institution.

Section III.

Bid Data Sheet

Bid Data Sheet

The following specific data for the goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

A-Introduction	
ITB 2.1	The invitation for Bids is opened to all suppliers having registration for National Tax Number &Sales Tax Number with Federal Board of Revenue.
ITB2.3	Government owned enterprises may participate, only if they are legally allowed.
ITB 2.4	In addition to the contents of ITB 2.4 the bidder shall not be blacklisted by any organization of the Government of the Punjab as well as Federal Government. The bidder shall provide affidavit to this effect.
ITB 4.1	Name of Purchaser: Director, Punjab Bio-energy Institute (PBI), University of Agriculture, Faisalabad (UAF)
B- Bidding Documents	
ITB 5.1(h)	Not applicable
ITB 6.1	Purchaser's address: Director, Punjab Bio-energy Institute (PBI), UAF, telephone, and facsimile numbers through Directorate of Procurement & Inventory Control (P&IC) University of Agriculture, Faisalabad Phone No. 041-9200898 Fax. 041-9200898 **FOR TECHNICAL RESPONSE:** **1. Director (PBI) Convener** **2. Project Director (PBI) Member** **3. Director (P&D) Member** **4. Director (DPIC) Member** **5. Resident Auditor Member**
C-Preparation of Bid	
ITB 8.1	Language of the bid. "English"
ITB 11.2 (a & b)	Prices on FOR and FIS Plus as per 11.2 (a & b) respectively shall be mentioned separately
ITB 11.2 (c) **ITB 11.3**	Not applicable
ITB 13.3 (d)	Qualification requirements. 1. **Company /Bidder Profile:** a. Experience in the relevant field minimum 3 Years b. HR strength/Manpower with the Bidder c. Direct or indirect genuine source / relationship with the Principal

	d. Technical expertise with the bidder e. Sound financial position of the bidder (cash available equal to 50% of the quoted value as per bank statement) or 5 time sales volume of quoted value as per Income tax returns of last financial year. f. Name of owner/proprietor g. Copy of CNIC h. Date of Establishment, Age of Firm i. Copy of NTN and Sales Tax Registration j. Copy of Professional Tax k. Copy of Punjab Revenue Authority (PRA) (if required)
ITB 15.1	Amount of bid security. 2% of the quoted value in shape of Call Deposit Receipt (CDR) in favour of Director (DPIC), UAF to be attached with Technical Bid.
ITB 16.1	Bid validity period. 90 Days
ITB 17.1	Bid: Financial and Technical Separately. Also a soft copy of Technical Bid Only
D-Submission of Bid	
ITB 18.2 (a)	Address for bid submission. Directorate of Procurement & Inventory Control, University of Agriculture, Faisalabad
ITB 18.2 (b)	Tender Notice No.130/2015
ITB 19.1	Deadline for bid submission.14.12.2015
E-Bid Evaluation	
ITB 25.1(a)	State Bank or a Commercial Bank to be read as State Bank of Pakistan and National Bank of Pakistan
ITB 25.2	The common base currency is PAK Rupee to be converted as per rate of the bank shown in ITB 25.1(a) of the bid data sheet on the date of opening of the financial bid.
ITB 26.3 (a)(i)	The SCC stipulates the payment schedule offered by the purchaser. If a bid deviates from the schedule then it will be considered as non-responsive.
ITB 26.3 (c)	The bidder will provide the cost of spare parts required to be replaced during whole life of the goods after the expiry of warranty period.
ITB 26.3 (e)	The bidder will provide :- i) Cost of consumables ii) Unit of energy consumption per hour iii) Life cycle of the goods
ITB 26.3 (f)	Performance and productivity of Articles. As per Technical Specification
ITB 26.3 (g)	As per specification.
ITB 27	As per ITB clause 10.2 prior to the award of procurement contract
ITB 33	Subject to PPRA Rule 2014/UAF Procurement Rule 2014, the bidder with the lowest evaluated bid, if not in conflict with any other law, shall be awarded the procurement contract within the original or extended bid validity period after 10 days of announcement of the evaluation report.

Section IV.

General Conditions of Contract

Table of Clauses

General Conditions of Contract

1. Definitions

1.1 In this Contract, the following terms shall be interpreted as indicated:

(a) "The Contract" means the agreement entered into between the Purchaser and the Supplier, as recorded in the Contract Form signed by the parties, or the supply order issued by the purchaser to the supplier, as the case may be, including all attachments and appendices thereto and all documents incorporated by reference therein.

(b) "The Contract Price" means the price payable to the Supplier under the Contract for the full and proper performance of its contractual obligations.

(c) "The Goods" means all of the equipment, machinery, and/or other materials which the Supplier is required to supply to the Purchaser under the Contract.

(d) "The Services" means those services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Supplier covered under the Contract.

(e) "GCC" means the General Conditions of Contract contained in this section.

(f) "SCC" means the Special Conditions of Contract.

(g) "The Purchaser" means the organization purchasing the Goods, as mentioned in Bid Data Sheet**.**

(h) "The Purchaser's country" is **Pakistan.**

(i) "The Supplier" means the individual or firm supplying the Goods and Services under this Contract and **named in Supply Order.**

(j) "The University" means the **University of Agriculture, Faisalabad**.

(k) "The Project Site," where applicable, means the place or places **named in Bid Data Sheet and technical specifications**

(l) "Day" means calendar day.

2. Application

2.1 These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract.

3. Country of Origin

3.1 All Goods and Services supplied under the Contract shall have their origin in the countries as elaborated in the T**echnical Specifications.**

3.2 For purposes of this Clause, "origin" means the place where the Goods were mined, grown, or produced, or from which the Services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.

3.3 The origin of Goods and Services is distinct from the nationality of the Supplier.

4. Standards

4.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standards appropriate to the Goods' country of origin. Such standards shall be the latest issued by the concerned institution.

5. Use of Contract Documents and Information; Inspection and Audit by Purchaser

5.1 The Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.

5.2 The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated in GCC Clause 5.1 except for purposes of performing the Contract.

5.3 Any document, other than the Contract itself, enumerated in GCC Clause 5.1 shall remain the property of the Purchaser and shall be returned (all copies) to the Purchaser on completion of the Supplier's performance under the Contract if so required by the Purchaser.

5.4 The Supplier shall permit the Purchaser to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the Purchaser, if so required by the Purchaser.

6. Patent Rights

6.1 The Supplier shall indemnify the Purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof in the Purchaser's country.

7. Performance Security

7.1 Within Seven (07) days from the issuance of acceptance letter from the Purchaser, the successful Bidder shall furnish the performance security in shape of CDR or Bank guarantee at the discretion of the Purchaser in the amount **specified in SCC.** In case the amount of bid security is equal or greater than the value of the goods to be supplied then the bidder shall not require furnishing the performance security separately, it will be retained or deducted from the bidder's claim on bidder's choice.

7.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

7.3 The performance security shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Purchaser and shall be in one of the following forms:

(a) bank guarantee or CDR issued by a reputable bank located in the Purchaser's country or abroad, acceptable to the Purchaser, in the form provided in the bidding documents or another form acceptable to the Purchaser.

7.4 The performance security will be discharged by the Purchaser and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC.**

8. Inspections and Tests

8.1 The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. **SCC** and the Technical Specifications shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing, in a timely manner, of the identity of any representatives retained for these purposes.

8.2 The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at point of delivery, and/or at the Goods' final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no

charge to the Purchaser.

8.3 Should any inspected or tested Goods fail to conform to the Specifications, the Purchaser may reject the Goods, and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.

8.4 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival in the Purchaser's country shall in no way be limited or waived by reason of the Goods having previously been inspected, tested, and passed by the Purchaser or its representative prior to the Goods' shipment from the country of origin.

8.5 Nothing in GCC Clause 8 shall in any way release the Supplier from any warranty or other obligations under this Contract.

9. Packing

9.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.

9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in SCC, and in any subsequent instructions ordered by the Purchaser.

10. Delivery and Documents

10.1 Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in the Schedule of Requirements. The details of shipping and/or other documents to be furnished by the Supplier are specified in SCC.

10.2 For purposes of the Contract, "CFR," "CPT", the terms used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of *Incoterms* published by the International Chamber of Commerce, Paris.

10.3 Documents to be submitted by the Supplier are **specified inSCC.**

11. Insurance

11.1 The Goods supplied under the Contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery in the manner **specified in the SCC.**

11.2 Where delivery of the Goods is required by the Purchaser on a CFR or CPT basis, the Purchaser shall arrange and pay for cargo insurance, naming the supplier as beneficiary.

12. Transportation

12.1 Where the Supplier is required under Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Purchaser or other agreed point shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.

12.2 Where the Supplier is required under Contract to deliver the Goods CFR or CPT, transport of the Goods to the port of destination or such other named place of destination in the Purchaser's country, as shall be specified in the Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.

12.3 Where the Supplier is required under the Contract to transport the Goods to a specified place of destination within the Purchaser's country, defined as the Project Site, transport to such place of destination in the Purchaser's country, including insurance and storage, as shall be specified in the Contract, shall be arranged by the Supplier, and related costs shall be included in the Contract Price.

12.4 Where the Supplier is required under Contract to deliver the Goods CFR or CPT, no restriction shall be placed on the choice of carrier. Where the Supplier is required under Contract (a) to deliver the Goods FOB or FCA, and (b) to arrange on behalf and at the expense of the Purchaser for international transportation on specified carriers or on national flag carriers of the Purchaser's country, the Supplier may arrange for such transportation on alternative carriers if the specified or national flag carriers are not available to transport the Goods within the period(s) specified in the Contract.

13. Incidental Services

13.1 The Supplier may be required to provide any or all of the following services, including additional services, if any, **specified in SCC:**

(a) performance or supervision of on-site assembly and/or start-up of the supplied Goods;

(b) furnishing of tools required for assembly and/or maintenance of the supplied Goods;

(c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;

(d) performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and

(e) training of the Purchaser's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.

13.2 Prices charged by the Supplier for incidental services, if not included in the Contract Price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

14. Spare Parts

14.1 As **specified in SCC,** the Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

(a) such spare parts as the Purchaser may elect to purchase from the Supplier, provided that this election shall not relieve the Supplier of any warranty obligations under the Contract; and

(b) in the event of termination of production of the spare parts:

(i) advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and

(ii) following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

15. Warranty

15.1 The Supplier warrants that the Goods supplied under the Contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in

design and materials unless provided otherwise in the Contract. The Supplier further warrants that all Goods supplied under this Contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the Purchaser's specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions prevailing in the country of final destination.

15.2 This warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the Contract, or for eighteen (18) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless **specified otherwise in SCC.**

15.3 The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty.

15.4 Upon receipt of such notice, the Supplier shall, within the period specified in notice or in SCC and with all reasonable speed, repair or replace the defective Goods or parts thereof, without costs to the Purchaser.

15.5 If the Supplier, having been notified, fails to remedy the defect(s) within the period specified in the notice or in SCC, the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

16. Payment

16.1 The method and conditions of payment to be made to the Supplier under this Contract shall be **specified in SCC.**

16.2 The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and Services performed, and by documents submitted pursuant to GCC Clause 10, and upon fulfillment of other obligations stipulated in the Contract.

16.3 Payments shall be made promptly by the Purchaser, but in no case later than thirty (30) days after submission of an invoice or claim by the Supplier.

16.4 The currency or currencies in which payment is made to the Supplier under this Contract shall be **specified in SCC** subject to the following general principle: payment will be made in the currency or currencies in which the payment has been requested in the Supplier's bid.

16.5 All payments shall be made in the currency or currencies

specified in the SCC pursuant to GCC 16.4.

17. Prices

17.1 Prices charged by the Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments **authorized in SCC** or in the Purchaser's request for bid validity extension, as the case may be.

18. Change Orders

18.1 The Purchaser may at any time, by a written order given to the Supplier pursuant to GCC Clause 32, make changes within the general scope of the Contract in any one or more of the following:

(a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;

(b) the method of shipment or packing;

(c) the place of delivery; and/or

(d) the Services to be provided by the Supplier.

18.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within thirty (30) days from the date of the Supplier's receipt of the Purchaser's change order.

19. Contract Amendments

19.1 Subject to GCC Clause 18, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

20. Assignment

20.1 The Supplier shall not assign, in whole or in part, its obligations to perform under this Contract, except with the Purchaser's prior written consent.

21. Subcontracts

21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or obligation under the Contract.

21.2 Subcontracts must comply with the provisions of GCC Clause 3.

22. Delays in the Supplier's Performance

22.1 Delivery of the Goods and performance of Services shall be made by the Supplier in accordance with the time schedule prescribed by the Purchaser in the Schedule of Requirements.

22.2 If at any time during performance of the Contract, the Supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of Contract.

22.3 Except as provided under GCC Clause 25, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 23, unless an extension of time is agreed upon pursuant to GCC Clause 22.2 without the application of liquidated damages.

23. Liquidated Damages

23.1 Subject to GCC Clause 25, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage **specified in SCC.** Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause 24.

24. Termination for Default

24.1 The Purchaser, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate this Contract in whole or in part:

(a) if the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 22; or

(b) if the Supplier fails to perform any other obligation(s) under the Contract.

(c) if the Supplier, in the judgment of the Purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this clause:

"corrupt practice" means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution.

"fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition.

24.2 In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 24.1, the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Supplier shall continue performance of the Contract to the extent not terminated.

25. Force Majeure

25.1 Notwithstanding the provisions of GCC Clauses 22, 23, and 24, the Supplier shall not be liable for forfeiture of its performance security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

25.2 For purposes of this clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

25.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

26. Termination for Insolvency

26.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter

to the Purchaser.

27. Termination for Convenience

27.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

27.2 The Goods that are complete and ready for shipment within thirty (30) days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

(a) to have any portion completed and delivered at the Contract terms and prices; and/or

(b) to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Services and for materials and parts previously procured by the Supplier.

28. Settlement of Disputes

28.1 If any dispute or difference of any kind whatsoever shall arise between the Purchaser and the Supplier in connection with or arising out of the Contract, the parties shall make every effort to resolve amicably such dispute or difference by mutual consultation.

28.2 If the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

28.2.1 Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

28.2.2 Arbitration proceedings shall be conducted in accordance with the rules of procedure **specified in the SCC.**

28.3 Notwithstanding any reference to arbitration herein,

(a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise

agree; and

(b) the Purchaser shall pay the Supplier any monies due the Supplier.

29. Limitation of Liability

29.1 Except in cases of criminal negligence or willful misconduct, and in the case of infringement pursuant to Clause 6,

(a) the Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser and

(b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

30. Governing Language

30.1 The Contract shall be written in the language **specified in SCC.** Subject to GCC Clause 31, the version of the Contract written in the specified language shall govern its interpretation. All correspondence and other documents pertaining to the Contract which are exchanged by the parties shall be written in the same language.

31. Applicable Law

31.1 The Contract shall be interpreted in accordance with the laws of the Purchaser's country, unless otherwise **specified in SCC.**

32. Notices

32.1 Any notice given by one party to the other pursuant to this Contract shall be sent to the other party in writing or facsimile and confirmed in writing to the other party's address **specified in SCC.**

32.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

33. Taxes and Duties

33.1 A foreign Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's country and purchaser's country as **specified in SCC.**

33.2 A local Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.

Section V.

Special Conditions of Contract

Table of Clauses

SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

1. **Performance Security (GCC Clause 7)**

GCC 7.1—

A. For goods offered from within Pakistan and abroad by the local agent by Pakistan:

the successful Bidder shall furnish the performance security @ 10% of the value of Supply Order or Contract in shape of CDR in favour of Director (P&IC), UAF for main Campus, and of Principal or Projector Director as the case may be for sub campuses within Seven (07) days from the issuance of acceptance letter from the Purchaser. In case the amount of bid security is equal or greater than the value of the performance security, then the bidder shall not require to furnish the performance security separately.

B. 2% CDR of general type good (s) will be kept for 3 months or when the good (s) are fully consumed whichever is earlier.

GCC 7.3 a): Bank Guarantee is not allowed

2. **Inspection and Tests (GCC Clause 8)**

GCC 8.1- By the concerned purchaser in accordance with the specifications or samples or both as required.

3. **Delivery and Documents (GCC Clause 10)**

GCC 10.1&10.3:

A. For goods offered from abroad by the local agent in Pakistan:

(i) Where the supplier shall is require under contract to deliver, install and commission the goods on FIS+ UAF basis, the supplier will ship the goods in favour of the Purchaser. The Purchaser will arrange clearance of the goods on the risk and expense of the supplier. All costs, expenses, charges, taxes, duties etc. whatsoever except customs duties incidental to delivery, installation and commission the goods from port of destination to UAF site shall be paid by the supplier. For clearance of the goods, the supplier shall provide copies of the following documents immediately after shipment of the goods:-

(a) Airway Bill / Bill of Lading as the case may be

(b) Commercial Invoice

(c) Packing List

(d) Certificate of Origin

GCC 10.2: Not applicable

4. **Insurance, Transportation and Incidental Charges etc.(GCC Clause 11, 12 & 13)**

i. The supplier shall require to deliver, install and commission the goods on Free in Store Plus (FIS+), (all domestic & abroad costs, expenses/charges, duties, taxes, whatsoever including insurance, transportation, incidental and clearing charges etc. except customs duties shall be paid by the supplier) UAF.

5. **Warranty (GCC Clause 15)**

GCC15.2&15.4: One year free of cost labour and material etc. at site from the date of commissioning of goods.

6. **Payment (GCC Clause 16)**

GCC-16.1, 16.2&16.4:
A. For goods offered from abroad by the local agent in Pakistan:
(i) Where the supplier is required under contract to deliver, install and commission the goods on Free in Store Plus (FIS+). The Purchaser shall pay in Pak Rupees equivalent to price of the FIS+ goods as per selling exchange rates of the State Bank of Pakistan/National Bank of Pakistan prevailing on the date of opening of financial bid after complete commissioning/acceptance of the goods and submission of the bill whichever is later (not later than thirty days).

7. **Prices (GCC Clause 17)**
GCC17.1: No Price adjustment is allowed.
8. **Change Orders (GCC Clause 18)**
Not applicable
9. **Liquidated Damages** (GCC Clause 23)

GCC 23.1—Applicable rate:

The liquidated damages, if imposed, will be recovered at the rate of upto0.67% of the value of goods supplied/installed/commission late per day or a part of a period exceeding the original delivery period, subject to the provision that the total liquidated damages thus imposed will not exceed 10% of the total value of the goods delivered/installed/commission late.

10. **Settlement of Disputes (GCC Clause 28)**

The settlement of dispute will be settled in accordance with mechanism for redresal of grievances and settlement of dispute as specified below:-

Complaints of bidder/contractor shall be disposed/settled by a committee and arbitration prior to the entry into force and after into force of procurement contract respectively. Accordingly, grievances committee with powers and terms of reference and method of arbitration are as under:-

A. Grievances Committee:

The committee comprises the following to address the complaints of the bidders prior to entry into force of the procurement contract:-

i.	The Treasurer (E.mial address: treasurer_uaf@yahoo.com) (Convener)	
ii.	Director, Punjab Bio-energy Institute (PBI)	(Member)
iii.	Resident Auditor or the Technical Expert(s) not below the rank of Assistant Professor	(Member)
iv.	The Director (DPIC)	(Secretary)

Any bidder feeling aggrieved by any act of the procuring agency after the submission of his bid may lodge a written complaint concerning his grievances not later than 10 days after the announcement of the bid evaluation report under rule 37 of the UAF Procurement Rules 2014.

The committee shall address the complaints of bidders that may occur prior to the entry into force of the procurement contract. The committee shall investigate and decide upon the complaint within fifteen days of the receipt of the complaint. Mere fact of lodging of a complaint shall not warrant suspension of the procurement process.

Any bidder not satisfied with the decision of the committee may lodge an appeal in the relevant court of jurisdiction.

B. Arbitration:

After coming into force of the procurement contract, all matters of dispute or difference except regarding rejection of goods by the Inspector under GCC clause 8 (Standard Bidding Document) or cancellation of the contract by the Purchaser, under GCC Clause 24 and 27 (Standard Bidding Document) arising out of the agreement between the parties thereto, the settlement of which is not otherwise specially provided for in contract agreement, shall be referred to arbitration as under:-

(a) Foreign Currency Contracts (EXW/FOB/CFR/CPT, etc.) made directly with Foreign Principal / Manufacturer

i. The dispute shall be referred for adjudication to two arbitrators one to be nominated by each party, who before entering upon the reference shall appoint an umpire by mutual agreement, and if they do not agree, a judge of the Superior Court will be requested to appoint the umpire. The arbitration proceedings shall be held in Pakistan and under Pakistan Law.

ii. The venue of arbitration shall be the place from which the contract is issued or such other places as the Purchaser at his discretion may determine.

iii. Arbitration award so given will be firm and final.

(b) Indigenous (FOR) contracts

The settlement of dispute, if not otherwise especially provided for in the contract shall be referred for the decision of Vice Chancellor, University of Agriculture, Faisalabad. His decision shall be final and binding on both the parties. The work under the contract shall if reasonably possible continue, under the proceedings before the Vice Chancellor and no account of such proceeding unless they are subject of the dispute.

Note:

- The arbitration award shall be recorded in writing.
- EXW/FOB/CFR/CPT, etc., contracts made through local agents would be dealt under sub para-B (b) above.

(c) Prior Notice for arbitration:

If the supplier intends to go for arbitration, he shall have to give 30 days notice in writing informing the purchaser of his intention to refer to the points of differences or dispute of arbitration. He shall have to define clearly the point of difference and or dispute in his notice.

C. Court Jurisdiction

Only the Courts at Faisalabad shall have exclusive jurisdiction to adjudicate upon any "lis" brought by either of the parties in relation to the contract.'

11. **Applicable Law (GCC Clause 31)**

GCC 31.1—UAF Procurement Rules 2014 and Laws governing in Pakistan

12. **Notices (GCC Clause 32)**

GCC 32.1: The Supplier shall provide address for notice purposes:

13. **Taxes and Duties (GCC Clause 33)**

Section VI.

Schedule of Requirements

Schedule of Requirements

Number **Description** **Quantity** **Delivery schedule**:
4 Weeks for FOR Supply
10 weeks for FIS+ Supply

Sr. No.	Item	Justification	Qty
1.	**Digital vernier caliper and screw gage**	To measure the size of different samples before and after testing on different equipments	2 set (4 pieces)
2.	**Complete System for Converting Biomass to Syngas** Maximum Gas Flow Rate: 60 m3/hr ~20kWe or 380,000 BTU Minimum Gas Flow Rate: 10 m3/hr ~3kWe or 60,000 BTU) Gas Energy Density 6.5 MJ/m3 Gas Composition CO: 22%, H2: 20%, CH4: 3% CO2: 10%, N2: 45% Biomass Consumption: 1.2 kg biomass = 3 m3 gas = 1 kWhe Run Time per Hopper Fill: approximate @ 200 kg/m3 fuel density 5 kW: 15 m3/hr = 11 hrs 10 kW: 31 m3/hr = 5.5 hrs 20 kW: 62 m3/hr = 2.8 hrs Max. Continuous Operation: ~12 hours Start Up Time: 5 -20 min. Gasifier v5 GEK Gasifier with Thermal Recycling Automation Arduino Based Microcontroller Feed System Batch Hopper with Feedstock Auger Filtration Packed Bed Gas Mixing Active PID Controlled Wide Band O2 Sensor Mounting Skid Power coated Steel Flare Stack Premixed, Auto-Igniting User Kit Tools, Consumables Along with compatible online UPS, batteries and all compatible accessories	To measure and analyze the performance of different types of gasifiers on using different kinds of bio-degradable material	1 sets
3.	**Household biomass gasifiers** Gas output 3-6 m³/h Dimension 1250*550*1100 mm Package 450*450*750mm Weight 50 kg Compatible with various of raw material as fuel like all kinds of straw, haulm, wheat straw, carvings, corncob, branch, sawdust, wood shavings ,weed and all kinds of plant waste, etc. All compatible and necessary accessories	To measure and analyze the production of producer gas for house applications and test it on the stove for cooking	2 set
4.	**Hinged Tube Furnaces RS for horizontal or vertical Operation up to 1300 °C, Gas Atmosphere or Vacuum** Heated Length: 1000 mm Tube length: 1350 mm Cascade controller with temperature measurement in the working tube and in the oven chamber behind the tube Working tubes designed for process requirements Different gas supply packages for protective gas and vacuum operation 3-zone control for optimization of temperature distribution Burst protector for heating elements and/or as support surface for the load Stand for vertical operation 3-zone control for optimization of temperature distribution Burst protector for heating elements and/or as support for the load, Stand for vertical operation Gas collection (vacuum) tubes Along with compatible servo stabilizer and all necessary and compatible accessories	To test different biodegradable materials for producer gas production	2 sets
5.	**Portable FTIR gas analyzer** Typically set-up to measure H2, H2O, H2S, CO2, CO, NO, NO2, N2O, SO2, NH3, CH4, HCl, HF and different VOC´s. Resolution: 8 cm-1 or 4 cm-1 Scan frequency: 10 scans / s Detector: Peltier cooled MCT Source: SiC, 1550 K Beam splitter: ZnSe Window material: ZnSe Wave number range: 900 - 4 200 cm-1 Structure: Multi-pass, fixed path length 5.0 m Material: 100 % rhodium coated aluminum	To analyze the concentration of different gases in biogas, producer gas and exhaust gases	1 set

	Mirrors: Fixed, protected gold coating Volume: 0.4 liters Connectors: Inlet Swagelok 6 mm Outlet Swagelok 8 mm Gaskets: Viton® O-rings Temperature: 0-750 ^{O}C Analysis software: Calcmet for Windows Portable sampling probe Heated lines Laptop PC with Calcmet TM software Power connection standard plug CEE-22 Optional analog signals in external PC: ADAM 5000/TCP module (for analog inputs, outputs, relays) Including Measurement Standards Calibration Standards and all necessary accessories		
6.	**Sieve shaker with all sieve set** Used for multi-purposes 15 sieves of different sieve opening size Timer: 1 – 99 minutes Low noise level With servo stabilizer and power supply	Used for sample preparation to analyze on different machines.	1 set
7.	**Analytical balance** Range: 0 to 500 g	Used for sample preparation for analysis on different instruments	1 set
8.	Metric combination wrench set		1 unit (32 pieces)
9.	Drive socket set complete		1 unit (99 pieces)
10.	Adjustable wrench set		1 unit (6pieces)
11.	Plier and cutter set		1 unit (12 pieces)
12.	Magnet screw driver set (different sizes)		1 unit (40 pieces)
13.	Adjustable pin spanner wrench set		1 unit (6 pieces)
14.	Pipette set (10 ml)		2 unit
15.	Gas supply pipe (plastic)		10 ft
16.	Portable welding plant		2 set
17.	Portable drilling machine Large Small		2 set
18.	Oxygen Bomb Calorimeter Working Reagents Calibrated Benzoic Acid, Nichromium wire, Crucibles		500 Tests Pack Roll Each
19.	Analytical Balance Digital Microprocessor Controlled, Capacity: 210 g, Readability: 0.1mg (0.0001g), Tare range: 210 gm, Repeatability: < + 0.1 mg, Linearity: < + 0.3 mg, Response time: 3 Second, Operating Temp: -10 to +40C, 10 – 80%RH, Draft Shield: All glass draught shield with 3 sliding doors,	Required for weighing very small amount (mg) of reagents	1
20.	Digital Heating baking plate Baking plate, temp max. 500°C	Used for the drying of films	1
21.	Hot plates with magnetic stir Temperature is up to 340°C, Integrated temperature sensor PT 1000 for precise temperature control. Control accuracy is 0.2°C, Excellent heat control accuracy at the work Plate: +1(<100°C) +1% (>100°C), Electronic speed control, max speed is 1500rpm.	Used for the organic synthesis of solar cell materials	04
22.	Overhead stirrer Stirrer for high velocity applications with low viscosity. Laboratory Stirrer with variable and constant speed range for media with viscosities up to 10.000 m Pas infinitely variable.	For syntheses and mixing of high viscosity materials	1
23.	Heating mantle 500 mL, 1000 mL Heating mantle with temperature up to maximum 400 Co	For synthesis purpose	02+02

24.	KGW Dewar vessel cylindrical Stainless steel,	For carrying out organic reactions at low temperature	03
25.	UV lamp Portable UV Lamp, 254/365nm Wavelength	For monitoring processing of a chemical reactions and check the purity of compounds on TLC.	03
26.	Class AAA Compact Solar Simulator General Specifications: Current-Voltage Measurement System IV tester, 20W version or so. All concerned software, Air mass filter Arc lamp housing, 1 arc lamp, power supply with igniter, filter holder and testing report, Vacuum Pump for Test Fixture, Interface Cables Equipment with similar or better specs will be considered Maker: US, Europe, Canada, Japan, or equivalent Options & Accessories: Compatible standard accessories Calibrated reference cell Online UPS backup Warranty with technical support Installation and training Shipment/ transportation Operating/Maintenance Manual	For testing of working solar cells	01
27.	Sonication apparatus Allows working from of 0.25 to 1 liter solution. Cooling / heating. Power 150W 230V 50/60Hz, Heating/cooling group to control circuitry with double chamber or serpentine of the extractors as previously described. 6 liter tub with circulation pump. From +100 °C to – 25 °C with digital control Usage of 200W to – 20°C, 150W to 0 °C, 2000 W for other temperatures.	Ultrasonication of sample to enhance efficiency of various physical and chemical process ,	1
28.	Rotary evaporator with all accessories including chiller With variable vacuum control, chiller and automatic lift, Temperature of outlet chilled water: 5~20˚C, Coolant R134a, Cooling capacity 500 W at 15°C, Tank volume 3 liter, pump capacity 2.5 l/min, 0.6 bar, from Germany, France, USA or Equivalent	For solvent separation, solution concentration	1
29.	Schlenk Line and Vacuum Manifolds 4-Port Vacuum Manifold, Double Bank, Airfree/Inert Line, Schlenk, Complete, cold trap, oil trap etc	The basic need for carrying out reactions at inert envirnment	02
30.	KGW Dish shaped dewar falsk Stainless steel, volume 250, 500 ml	For carrying organic synthesis reactions at low temp.	1+1
31.	Anti-Corrosion Spin Coater (8000 RPM & 6" wafer Max.) with Complete Accessories Case and spin disk made of Polypropylene (PP), Digital control box, Filter used to connect the pump and coater for preventing waste water from flowing into the pump. oil-less vacuum pump, Input Power:Default 220VAC, 50/60Hz, single phase, 1000W Max. Chamber diameter: 150 mm, 4 sets of PP anti-corrosive vacuum chucks with different sizes (Φ21mm、Φ38mm、Φ60mm, Φ100mm) Spin Speed Digital control panel with two programmable segments of different spin times and speeds 500 - 8000 RPM adjustable spinning speed at each segment. Spin Coater: 25.2cm (Φ) x 41cm(H), Lid and Bowl Liner, Digital controller: 23cm (L) x32cm(W) x16cm(H), Operation Manual.	For film making in the fabrication of solution processed solar cell	01
32.	TLC Sheets Thin layer chromatography (TLC)Aluminum sheets 20 x 20 cm	For the identification and purification of organic compounds	5 packets
33.	Refrigerator 16CFT , Lowest Temperature -10 C	For the storage of chemicals	01
34.	Electrochemical station (Potentiostate with electrodes) Delivers up to 1.0 amp. Working electrode voltages up to 25 V vs. the reference electrode. The 4-electrode cable accommodates counter, working and reference electrodes, in addition to a ground cable. Manually controlled cell voltage. Current vs. time is acquired and displayed in real time at 10 points per second. Have two auto-current ranges: 0 – 100 mA and 0 – 1 amp. The electrochemical instrument is specifically designed for oxide layer preparation by high-voltage anodization. Complete analytical cell kit (Teflon Cap cover 5 holes, Double Jacket cell	Electrochemistry, cyclic voltammeter, potential-current curve,	01

	vial, Teflon ring, Cell collar with clamp for analytical cell, Double Purge Tube, Platinum Counter electrode, Double nut for cell stand, Telescopic cell stand, Bridge tub e for 6mm diameter reference electrode, Calomel Reference Electrode		
35.	18"L Compact Three Zones Split Tube Furnace with optional Quartz Tube & Flange Double layer steel case with two cooling fans which ensure low surface temperature; Energy saving high purity fibrous alumina insulation; Two fibrous ceramic tube blocks, cooling fan in two ends for cooling flange and create larger temperature gradient. Heating elements: Fe-Cr-Al Alloy doped by Mo, Heating zone length three zones: 450 mm (18") in total Z1 - Z2 - Z3 : 152.4mm (6") + 152.4mm (6") + 152.4mm (6") +/-1ºC Constant Temperature Zone: 260 mm length Max. Temperature gradient ~100 oC/cm at central 1200°C. Fused Quartz Tube: 60 O.D x 55 I.D x 1000 L (mm), 80 O.D x 72 I.D x 1000 L (mm), Heating temperature Max. Heating Temperature: 1200°C at flowing gas Continuous Heating Temperature: 1100°C at flowing gas Max. Heating temperature at Vaccum 1000°C Max. Heating Rate: 20°C/min, Temperature Controllers .Three MTE certified Temperature controller with 30 programmable segments Built in PID Auto-Tune function with overheating & broken thermocouple protection. Over temperature protection and alarm allows for operation without attendant. +/- 1 ºC temperature accuracy. Three K type thermocouples (one for each zone). RS485 Communications Port. Vacuum Flange and Gauge: One pair of SS 304 vacuum flange with double high temperature silicone O-ring is Included ,Default flange with 1/4" Bard fittings, 1/4" tube feedthrough port (for 1/4" O.D thermocouple insert) and a KF25 vacuum port,One Vacuum/ pressure gauges. vacuum level: 10E-2 torr - 10E-5 torr	It will be used for thermolysis reactions, involving either organic or inorganic reactants. For the synthesis of superconductor.	01
36.	Dell Precision/ Any other Tower Workstation New or refurbished :Processor: Intel® Xeon® Processor E5660 (6 Cores, 12 Threads, 12M Cache, 2.80 GHz) X 2 Memory : 16GB DDR3 SDRAM at 1600MHz Hard Drive: 1 TB Serial ATA (7200 Rpm) Hard Drive Video Card : NVIDIA 256MB or Higher Power Supply: 1000W LCD: Dell 19” Keyboard : A4-Tech Mouse: A4-Tech Online UPS back up	Cluster system used for the design of organic materials for solar cells	14
37.	Gaussian software gaussian09.d.01	For the design of organic materials for solar cells	01
38.	Vacuum pump Vacuum Pump Diaphragm Oil or oil less , Max. Vacuum, 6L/min	For creating inert environment for synthesis	02
39.	Fume hood Work Area 102x67x75cm, Base cabinet Height is 62cm, the exterior size include the cabinet height, Protection class 1, Protection type IP20, Air velocity (m/s) ≥0.5m/s, ≤60dB (A), Exhaust duct PVC, standard length: 4 meters, Pipe collar 290, Pipe strap 1pc, Fluorescent lamp 21Wx1, UV lamp, Centrifugal fan, speed adjustable. The fan inside the fume hood, two layer toughened glass, 5mm thickness: motor control, height adjustable, Water tap, Water cup, Air tap, Water proof socket: 2, exterior body: cold-roll steel sheets, coated with anti-bacteria powder, interior body: adopts high grade melamine board with good acid and alkali resistance function, accessories for installation in the lab should be included, nitrogen cylinder with each fume hood	For fabrication, organic/inorganic synthesis, which produce fumes	02
40.	Liquid nitrogen container Capacity:10.0 Liters Empty Weight:6.7Kg Neck Diameter:90mm Outer Diameter:303mm Height:545mm Static Evaporation Loss Mass:0.18L/d Static Holding Time:55days Canister Outer Diameter:70 mm Canister Height:120mm	For carrying liquid nitrogen,	01

41.	Nitrogen gas Cylinder Nitrogen gas cylinder with good quality material	For creating inert environment for synthesis and fabrication.	02
42.	Vacuum Oven Up to 400C, with vacuum pump	For drying at low pressure/ inert atmosphere	01
43.	Freeze dryer ALPHA 1-2 LD Plus, (Lyophilizer) Freeze dryer ALPHA 1-2 LD Plus, (Lyophilizer) standard voltage **230 V, 50 Hz**, air cooled, refrigerator 0.43 kW (1/3 HP), CFC and H-CFC-free refrigerant, without vacuum pump, bench top unit, integrated support plate for direct mounting of a drying chamber or accessories with a diameter of 240 mm, stainless steel worktop, ice condenser and ice condenser chamber with drain valve for defrosted water, ice capacity max. 2.5 kg, ice condenser performance max. 2 kg/24 h, ice condenser temperature approx. - 60°C, ice condenser chamber 3.5 litres, with hot gas defrosting, vertical lay-out, suitable for freeze drying in round flasks, wide neck filter bottles and/or on unheated shelves, also suitable as a cooling trap for the rotational-vacuum concentrator RVC, equipped with process controller LD plus (Lyo-Display-plus): Clearly arranged graphic LC-display showing the process data (ice condenser temperature, process time, section time and vacuum in combination with vacuum measuring sensor A VSP 62 MV, part no. 125478), easily operated and intuitional menu navigation in German, English and French language, conversion of temperature and vacuum according to the vapour pressure above ice, vacuum control possible in connection with pressure control valve **Part no. 101521**, **Vacuum pump** with a suction capacity of 2.25 m3/h (37.5 l/min), 230 V, 50/60 Hz, incl. Small flange connections, suitable for freeze dryers of the ALPHA-Series, vacuum hose part no. 125702 is required. **Part No. 125302** **Vacuum hose incl. standard flange** connections DN 16/25 ISO-KF for external connection of the vacuum pumps RZ-2, RC-5, MZ, 2C and MD 4C **Part No. 125702** **Base plate** for freeze dryers ALPHA 1-2 for drying inside the acrylic chambers part no. 121450 and 121455. **Part No. 120890** **3 shelves with rim** Made of aluminium, diameter 200 mm, unheated, distances between the shelves are variable, for freeze dryers ALPHA 1-2, only in combination with base plate part no. 120890 and acrylic chambers part no. 121450 and 121455 **Part No. 120893** **Acrylic chamber** diameter 240 mm, height 285 mm, to accommodate shelves and sealing devices, with 8 connections for individually controlled rubber valves part no. 121860, incl. Stoppers NS 45/40. **Part No. 121455** **Rubber valve** for connection of vessels with DIN-internal grinding NS 29/32 or distributor part no. 121870. **Part No. 121860 – 8-Nos.** Filter insert for rubber valve Part no. 121860, to avoid transportation of small dry parts to the Ice condenser chamber. **Part No. 121891** **Vacuum Sensor AVSP 62MV** Complete unit as above Christ Made in Germany or Equivalent	To get dried algal biomass	1
44.	Viscometer **Temperature range:** 15° - 100°C. **Kinematic Viscosities:**0.5-6,000* mm2/s **Dimensions**: 254 mm wide x 305 mm deep x 598 mm high (10 x 12 x 23.5") **Power Supply Dimensions:** 343 mm wide x 356 mm deep x 159 mm high (13.5 x 14 x 6.25") **Weight:** 12.5 kg (27.5 lbs) without bath fluid, Power Supply and Waste Receiver **Shipping Weight:** 51 kg (113 lbs) with all units/accessories **Operating Conditions:** 15°-30°C, 10%-90% RH non-condensing, Installation Category II, Pollution degree 2 **Fuse Rating:** 115V & 100V Units: M 250V 8A, 1-1/4 x 1/4""; 230V Unit: M 250V 4A, 1-1/4 x 1/4" **Compliance:** CE Mark: EMC directive (89/336/EEC); Low voltage directive (73/23/EEC); HI-POT (1900 VDC, 60 sec.)	To determine the kinematic viscosity of biodiesel	1
45.	Rotary Evaporator **Technical Specification: -** Hand / Motor lift Motor lift Rotation speed (rpm) 20 – 280 Rotation speed setting 3.5” LCD display Drive Brushless DC motor with electronic speed control Heating capacity (W) 1,300 Temp. range heating bath (°C) 20 – 210 Temperature range accuracy (°C) ±1 Overheat protection bath (°C) Cut-off at 5°C over set temperature via separate PT 1000 Bath temperature setting 3.5” LCD display Heating bath temperature control Electronic / Digital	For the separation of lipid from organic solvents	1

	Secondary overtemp. Cut off (°C) 250 Material heating bath (mm) Stainless steel AISI 316L Volume heating bath (I) 4.5Liers Instrument is supplied with 1Litre evaporating and Receiving flask as standard.complete unit as above, operated on 220 Volts, Model Hei-VAP Advantage ML, **Heidolph, Made in Germany** or Equivalent		
46.	pH meter Digital Bench Model Microprocessor Controlled With parallel Temperature indication, PH Range -2.0 to 20.0 ±0.005pH, PH Resolution 0.005pH, MV Range ±1200.0mV, Accuracy mV ±- 0.3mv, Automatic Temperature Compensation, Temperature Range –5 to +105.0°C, Temperature accuracy ±0.1°C with two/three Point Calibration System, Battery operated as well as operated With 220 Volts Complete with following accessories:- a) Black Electrode stand with base. b) Plastic Beaker 50 ml. c) 3MKCL Solution 50 ml. d) Calibration Standard solutions PH 4, 7 & 10 50ml each. e) PH Electrode precision Type with Built in Temperature Sensor. Complete Package Model Inolab PH 7110/Set **WTW** **Made in Germany** or Equivalent	To maintain pH for different chemical reactions	1
47.	Water bath shaker Temperature range min. 5 °C above ambient up to +95 °C with additional boiling mode (+100 °C) □ State-of-the-art control technology of the Basic and models □ Microprocessor PID-temperature controller with integratedautodiagnostic system with fault indicator □ integrated digital timer from 1 min. to 99,59 hours □ Overtemperature Protection (double) □ Interior Stainless Steel Tank & Textured Stainless Steel Casing □ Fitted With Gabled Cover **Operated on 220volts, WNB Series.** Capacity 10 Lit., interior dimension 350x210x140mm Model WNB10, Memmert Made in Germany or Equivalent	For lipid extraction	1
48.	Centrifuge machine **TABLE - TOP** **CENTRIFUGE CE ISO 9001** **, ISO 14001** MAX. RPM : 5,500 RPM MAX RCF : 5,580 XG MAX CAPACITY : 480 ML 15 ML X 32 TUBES POWER : 220V 6A 1.5 KW 50Hz **M/S VISION SCIENTIFIC** **CO.,LTD./ KOREA** or Equivalent	For harvesting of algae	1
49.	Ultrasonic transducer horn Digital ultrasonic horn (Branson 450) made up of a titanium alloy with a tuner that allows working with a variable amplitude and duty cycle. The device also includes a thermostated water bath. Both the horn and the water bath are included into a soundproof chamber (Branson Ultrasonic Corporation (Danbury, Connecticut, USA) or Equivalent	For Trans esterification reaction	1
50.	Hot Plate with Magnetic Stirrer Temperature range up to 370°C, Variable Speed Control upto 1200rpm Heating Plate Ø: 155mm, Stirring capacity: 15 liter Power: 630 Watt, with PTFE follower, operated on 220 volts, Model ARE Velp, Made in Italy or Equivalent	For biodiesel production process	2
51.	Small Scale Biodiesel Unit Capacity 50 L Company: Globecore or Equivalent Minimum mixer throughput, feedstock, liters per minute 10 Minimum methanol and catalyst solution consumption, liters per minute 0.1-0.3 Minimum oil tank volume, liters 50 Minimum methanol/KOH solution tank volume, liters 12 Minimum finished product tank volume, liters 30 Oil heating temperature, degree Centigrade 40-70 Maximum power, kW 10.5 Power supply voltage at 50Hz, V 3 ~ 400 Control circuit voltage, V 220 Dimensions, mm – length 1200 – width 700	For Biodiesel production from animal fats and vegetable oil	1

	– height 1600 Max dry weight, kg 460		
52.	Gas Chromatograph General Description: Four level, three ramp temperature programming to 450°C (Oven Maximum software controller) Five method set-up, generation, storage, and copy. Up to two simultaneous analog outputs for integrator or recorder, switch cable to either detector. Digital electronic pressure readout with capillary injections. Up to six solenoid valves for split vent and gas sampling valve control. Features: • Up to 32-programmable timed events. External computer communications allows full instrument • Control plus two simultaneous channels of raw data. Battery RAM storage of GC methods, instrument configuration, and automation programs. • Capillary column injector (front). • CH B (Back) capillary column Injector. • Operating Temperature: 50°C to 450 °C in 1°C increments • Flow Controller: Programmable Pneumatic Control PPC (Electronic) • Accessories: As per manufacturer standard. • Thermal Conductivity Detector (TCD), (REAR). Total chrom Work Station Software Kit & dotLINK Integral LINK.	For gas analysis	01
53.	Power supply for Gel Electrophoresis Compact, space saving & light weight design, touch panel, audible & visible alarm, status alarm, constant voltage or current, safety features includes, no load detection, over voltage protection, automatic recovery after power failure, dimension 320x240x73mm, digital voltage range 10 – 300V in 1 Volt step, current 4–400 mA in 1mA steps 75 Watt max, design 4 parallel outputs, with timer control 0–999minute, operated on 220 Volts, Model Elite 300, Wealtec USA or Equivalent		01
54.	Anaerobic digester (Transparent) F30100020 DK8 Digester 230V/50-60HzDK8 Digestore 230V/50-60Hz Manufacturer / or Supplier : Velp / Italy or Equivalent	Cultivation of phototrophes for anaerobic digestion.	01
55.	Microscope (Binocular) Optika Italy 7 0.408.836 M-300/34 Trinocular microscope with halogen lamp and Infinitive Semi-plan Achromatic Objectives 4x, 10×, 40x, and 100x set 1 7.1 0.408.836*** Digital Camera with adapters set 1 Manufacturer / or Supplier : SCO-ENG / Germany or Equivalent	For microbes visualization/examination.	01
56.	Micropipette Mechanical Pipette-SCOpette P Autoclavable, Single-channel Adjustable Volume 8.1 0.382.013 SCOpette P volume 0.1-2.5µl pc 1 8.2 0.382.014 SCOpette P volume 0.5-10µl pc 1 8.3 0.382.015 SCOpette P volume 2-20µl pc 1 8.4 0.382.016 SCOpette P volume 5-50µl pc 1 8.5 0.382.017 SCOpette P volume 10-100µl pc 1 8.6 0.382.018 SCOpette P volume 20-200µl pc 1 8.7 0.382.019 SCOpette P volume 50-200µl pc 1 8.8 0.382.020 SCOpette P volume 100-1000µl pc 1. 8.9 0.382.021 SCOpette P volume 200-1000µl pc 1 8.10 0.382.022 SCOpette P volume 1000-5000µl pc 1 Manufacturer / or Supplier : SCO-ENG / Germany or Equivalent	For measuring precise volume of reagents/media	Complete range (10)
57.	Shaking Water Bath 43 1083 Shaking Water Bath General Description: Type GFL 1083 with reciprocating motion, capacity approx. 28 Ltr., digital temperature display, for max. 10 flasks of 500 ml capacity with tray 3960 and Flask clamp 3988 (tray and flask clamps not included!); Features: Temperature Range from 5°C above ambient up to 80.0°C, Temp.	For shaking of culture media.	01

	constancy ±0.5 K, mechanical temp. control (capillary thermostat); over temperature cut-out, Shaking frequency 10...250 rpm stepless adjustable, stroke length: 22 mm, stainless steel bath interior/shaking mechanism/lid and heating element, electrolytically galvanised steel sheet casing; Dimensions: 712x500x330 mm, 230V - 50/60 Hz, ca. 44 kg. 43.1 99999 Cover - Separat zu 1083 als Ersatzteil 43.2 1910 ProAqua Top 1 bottle for 200 ml 43.3 3920 Test tube tray, for 243 tubes, 160x 16/17 mm dia./ 100x 16/17 mm dia. 43.4 3921 Test tube tray, for max. 63 tubes dia. 31 mm 43.5 3922 Test tube tray, for max. 372 tubes, 100x12mm or 75x 12 mm (L x dia)		
58.	Vortex 45 9008200 TTS 2 IKA yellowline Test Tube Shaker 230V 50/60 Hz or Equivalent complete package with: MS 1.31 Test tube insert, 14 holes, diam. 8 mm incl. MS 1.32 Test tube insert, 6 holes, diam. 10 mm incl. MS 1.33 Test tube insert, 4 holes, diam. 15 mm incl. MS 1.34 Test tube insert, with no pre-drilled holes, incl. Supplier Manufacturer / Origin : IKA / Germany or Equivalent	For cells disruption.	01
59.	Radiometer Yellow–Springs–Kettering model 6.5-A radiometer through a Corning 7–69, 620- to 110-nm filter.	For light intensity measurement for phototrophes	01
60.	Digital multimeter Digital multimeter (DMM PCI-4070; National Instruments, Austin, TX, USA) or Equivalent	For measurement of electric current/ voltage	01
61.	Water Ultra purification System Bench top/Wall Mounted system for ultrapure lab water with output 2 L/min , EC 0.055µS/cm, Resistivity 18.2MΩ-cm Touch Screen LCD, TOC 1-5 ppb, DNase / RNAse Free Bacteria < 1 CFU/ml, Endotoxins < 0.001 EU/ml, Particles> 0.1µm < 1, Built in Conductivity, Dual Wavelength UV Lamp, Sterile Filter 0.2 µm, Power Supply 220-240VAC-50Hz. complete with Pre-Treatment Feed Water RO System 150 gallons capacity per day.	For ultrapure lab water	01
62.	**Herb Grinder** **Make: PRC** Or Equivalent Hi speed 24000 rpm grinding mill for plant material of sample capacity 200 grams or above. Power 220VAC-50Hz	This is important equipment to chop the fresh sample for biogas analyses	1
63.	**Bio-Reactor Simulator** **Make: Sweden** Or Equivalent The AMPTS II is a valuable system for conducting anaerobic biodegradability, methane potential and specific methanogenic activity (SMA) tests, allowing for the standardization of measurement procedures, data interpretation and reports. This allows users to determine the true dynamic degradation profile of any substrate, but also to find out the optimum mix of substrates for co-digesting, screen proper pre-treatment methods, and evaluate the need for additives. Including compatible servo motor stabilizer and compatible online UPS	Bio-reactor Simulator is crucial equipment that will be used to determine the biogas yield by anaerobic digestion and methane yield	1
64.	**Plant Canopy Analyzer** **Make: USA** Or Equivalent Handy model battery operated for direct readings of PAR & Leaf Area Index. LCD display. Big data storage capacity. Complete package including Probe, Software, Sensor, tripod and carrying case.	It is necessary equipment that measure the leaf area index of the energy crops which is important growth parameter	1
65.	**NIR Analyzer** **Make: USA** Or Equivalent Benchtop NIR Forage Analyzer is for Grasses, Hays, Legumes and Grain to measure Dry Matter, Protein, Crude Fiber, Ash, Sugar, NDF, ADF, ADL, Dry Matter Digestibility, and Other Parameters in 30 Seconds. Re-dispersive scanning monochromator with nominal bandwidth of 10 nm (FWHM). Tungsten halogen lamp light source with MTBF rating of 10,000 hours (User changeable). Data Interval1.0 nm. Custom dual cooled, extended InGaAs detectors. Wavelength 1100 - 2500 nm; 680 - 2500 nm (optional). Analyzer must complete with calibration package for dried grass, hay, legume and grain forages, both ensiled and fresh. A comprehensive list of constituents is predicted including instant access to a complete nutritional profile for all your forages. Complete built in	Biogas yield and methane yield is always mainly based on chemical composition. NIR analyzer is very important instrument that give chemical composition of the biomass for bio-energy production	1

	computer. Including compatible servo motor stabilizer and compatible online UPS.		
66.	**Electric Plateform Balance** **Make: UK** Or Equivalent Digital balance capacity 300kg with readability 100 grams. Steel Platform size 90x60 cm. Full Tare & different weighing units. RS-232 port with printer. Battery operated/DC power supply.	Electric platform will be used to weigh larger biomass samples in the field to calculate total biomass and biomass distribution of the energy crops	1
67.	**Digital Laboratory. Balance** **Make: UK** Or Equivalent Digital balance capacity 220 grams with readability 0.1mg. Full Tare & different weighing units. Pan size 90 mm. RS-232 ports with PC software. Glass hood & solid Aluminum body. complete with stabilizer & weighing boats	Lab. balance will be used to weigh the samples in the lab. on small scale.	1
68.	**Plant/Wood Chipper cum Shredder** Capacity 500 kg/hr. power 220 V AC-50 Hz	To cut the whole plant in small pieces for grinding	1
69.	**Digital Analytical balance** Capacity 220g / Readability 0.1mg. Pan size Φ 90 mm. Full Tare, Glass chamber & Aluminum Body. Electrical Supply 220VAC. Unit conversion facility. Complete with data software.		01
70.	**Digital Incubator** Single door with capacity 250 liter. Temperature range +5 to 65 ^{O}C. Single doors with lock & key. Humidity 40-95% by ultrasonic system. Digital programmable Microprocessor controlled. 7 inches Touch screen. Electrical Power 220VAC-50Hz with compatible Stabilizer including compatible servo motor Stabilizer + compatible UPS		02
71.	**Vortex Mixer** Mixing Speed: 300 to 3,000 rpm with timing 15 s to 99h59min / continuous. complete with 96x0.2ml PCR Tube Holder 24x0.5ml Tube Holder, 24x1.5/2.0ml Tube Holder, 8x15ml Tube Holder, 3x50ml Tube Holder. Electrical Power 220VAC-50Hz.		01
72.	**Ice Flake Machine** Daily production 20 kg. Storage capacity 10 kg. CFC-free/134a. With safety alarm of water shortage & bin full. Electrical Power 220VAC-50Hz.		01
73.	**Digital Water Bath** Capacity 9 liters or above. + 4 to 100^{o}C temperature with shaking speed up to 150rpm. Electrical Power 220VAC-50Hz. Interior material stainless steel with lid. Digital Microprocessor controlled with LED display. Complete with universal spring platform & SS rack for holding microtubes.		01
74.	**Vertical Rotary Evaporator** Speed 20-280 rpm with digital control. Movement by DC brushless motor. water bath temperature . Glassware lifting by motor. Water bath temperature RT+ to 180^{o}C with capacity 5 liters. Stoke 150mm. Microprocessor controlled with LED display. Electrical Power 220VAC-50Hz. complete with evaporating flask 500ml & 2000ml & receiving flask 500ml & 2000ml with compatible connector. Acid resistance acid vacuum pump with vacuum controller & circulating chiller.		01
75.	**Soxhlet Apparatus** 3 places heat system with temperature controller. Range up to 250^{o}C. Complete with clamp & glass assembly of 500 ml & 1000 ml. Electrical Power 220VAC-50Hz.		01

76.	**Upright -80 Freezer** Capacity 330 liters. Temperature range -10 to 80 oC with digital display. With Audiovisual safety Alarms. Door with look & key. Electrical Power 220VAC-50Hz. Complete with voltage stabilizer, including compatible servo motor Stabilizer + compatible UPS.		01
77.	**Gel doc EZ system** Gel Images Flatbed Scanner, CCD Image Sensor. Resolution Optical: 3200 dpi (7.9 um spot size, 63 lp/mm), Hardware: Up to 3200 x 6400 dpi, Default: 300 dpi, Light Source LED Scanning Area Reflective: 11.6" x 16.9" (294.6 x 429.3 mm / A3) Transparent: 11.6" x 16" (294.6 x 407.9 mm), Scanning Speed 4.9sec./20.16 sec.(Scanning Time/Total Time Including Calibration):10x10cm,300 dpi11.7sec./27.06 sec.(Scanning Time/Total Time Including calibration):24x24 cm,300 dpi 19.57sec./34.96 sec.(Scanning Time/Total Time Including Calibration):11.6”x16".Dynamic Range Transparency: 0.05D ~ 3.77D, Bit Depth Input: 48-bit color, 16-bit grayscale, Output: 24-bit color, 8-bit grayscale Connectivity Hi-Speed USB (USB 2.0), Power adaptor Gel trays 110 x 110 mm (2 sets), 240x240 mm (1 set), 12"x16"(1 set). Complete with 1D analysis Software including compatible servo motor Stabilizer + compatible UPS		01
78.	**Microscope** 7 0.408.836 M-300/34 Trinocular microscope with halogen lamp and Infinitive Semi-plan Achromatic Objectives 4x, 10×, 40x, and 100x set 17.1 0.408.836*** Digital Camera with adapters set 1 Manufacturer / or Supplier: SCO-ENG / Germany or Equivalent		01
79.	**Bio-Pad composter** Assembled Dimensions: 26.5-Inch long x 15.5-Inch wide x 16-Inch Tall. Usage Food scrap recycling Raising soldier grubs Digestion of pet waste. Dual migration ramps for auto-harvesting into collection bucket. Drainage pad / plate allows liquids to passively seep into liquid catchment area. Top lip barrier helps prevent grub escape while increasing the surface for egg laying.		01
80.	Transient plane source (TPS) sensor Radius = 6.4 mm With Kapton insulation and a cable	It is used in Thermal Constant Analyzer that is already in our lab. This machine uses different sensor sizes depending on the size of sample. This sensor is required to measure thermal transport properties of biomass and biochar in pellet form.	01
81.	Pt-100 thermometer Temperature range=-40 to +400 ^{0}C	It will be used to measure the exact temperature of specimen during thermal properties measurements. Moreover, it will be used to calibrate the furnace.	01
82.	Hydraulic press with a set of dies Maximum load= 20 tones Pellet size= 1 inch (square) Radius= 30 mm	It will be used to form pellets from biomass and biochar to determine the effect of density on thermal properties.	01

83.	EC meter-Bench top EC range: 0 to 199.9µS/cm Temperature compensation: -10 to 120 ^{0}C	Ionic conductivity measurements of biodiesel/ bio oil will indicate the overall concentration of different ions mixtures i.e. Na, K, Cl etc. in the final product	01
84.	Data acquisition unit Labjack U12 Resolution= 12bit inputs=8 Output=2	To check the stability of an apparatus by measuring and storing the voltages across the different electrical components of an instrument	01
85.	Chloride meter Volume range: 50µl Measuring Range: 5-999 mmol/l. Accuracy error: 0.4 mmol/l or 1%. Precision error: 0.1mmol/l 100>c>10mmol/l, 1mmol/l 999>c>100mmol/l. Power supply: 220V, 50/60 Hz.	The presence of Cl ions in liquid bio-fuel/biodiesel can severely corrode the metallic components of pyrolysis plant as well the bio-fuel storage tank. Therefore, it is necessary to determine the Cl content in solid biomass and biofuels. If the concentration of Cl ions exceeds its safe limit then the biomass can be washed/cleaned before using in the reactor	01
86.	Vacuum pump Max. pumping speed at 50/60Hz =m³/h 0.7/0.85 Ultimate vacuum=mbar 100	The porosity of a material has a direct effect on its thermal properties i.e. thermal conductivity and diffusivity. The porosity of biomass briquettes/ biochar can be estimated by comparing its mass differences in dry and fully saturated state. Knowledge of porosity and moisture content is essential to optimize fuel production by pyrolysis	01
87.	Glass desiccators Diameter=6”	It is required to keep the samples in dry state and avoid its interactions with the environment.	02
88.	Gilson pipits a)Measuring Range 1 to 10µl, Accuracy ±0.040µl, b) Measuring Range 100 to 1000µl, Accuracy ±1.5µl	For the preparation of standard samples/solutions for chloride meter and flame photometer and for dilution of extracts	01+01=02
89.	Vortex mixer Electronic speed regulation 0 – 3000 rpm Vibration orbit 4.5 mm,	To homogeneously mix an experimental sample and a dilutant for pH, EC, ionic (i.e. Na, K, Cl etc.) content measurements	01

Section VII.

Technical Specifications

TECHNICAL SPECIFICATIONS

The bidder shall quote the goods along with the serial number mentioned below against each and also provide softy copy in Excel Sheet without price as technical bid. The quoted goods shall have point to point commentary.

Sr. No.	Item	Justification	Qty
1.	**Digital vernier caliper and screw gage**	To measure the size of different samples before and after testing on different equipments	2 set (4 pieces)
2.	**Complete System for Converting Biomass to Syngas** Maximum Gas Flow Rate: 60 m3/hr ~20kWe or 380,000 BTU Minimum Gas Flow Rate: 10 m3/hr ~3kWe or 60,000 BTU) Gas Energy Density 6.5 MJ/m3 Gas Composition CO: 22%, H2: 20%, CH4: 3% CO2: 10%, N2: 45% Biomass Consumption: 1.2 kg biomass = 3 m3 gas = 1 kWhe Run Time per Hopper Fill: approximate @ 200 kg/m3 fuel density 5 kW: 15 m3/hr = 11 hrs 10 kW: 31 m3/hr = 5.5 hrs 20 kW: 62 m3/hr = 2.8 hrs Max. Continuous Operation: ~12 hours Start Up Time: 5 -20 min. Gasifier v5 GEK Gasifier with Thermal Recycling Automation Arduino Based Microcontroller Feed System Batch Hopper with Feedstock Auger Filtration Packed Bed Gas Mixing Active PID Controlled Wide Band O2 Sensor Mounting Skid Power coated Steel Flare Stack Premixed, Auto-Igniting User Kit Tools, Consumables Along with compatible online UPS, batteries and all compatible accessories	To measure and analyze the performance of different types of gasifiers on using different kinds of bio-degradable material	1 sets
3.	**Household biomass gasifiers** Gas output 3-6 m³/h Dimension 1250*550*1100 mm Package 450*450*750mm Weight 50 kg Compatible with various of raw material as fuel like all kinds of straw, haulm, wheat straw, carvings, corncob, branch, sawdust, wood shavings ,weed and all kinds of plant waste, etc. All compatible and necessary accessories	To measure and analyze the production of producer gas for house applications and test it on the stove for cooking	2 set
4.	**Hinged Tube Furnaces RS for horizontal or vertical Operation up to 1300 °C, Gas Atmosphere or Vacuum** Heated Length: 1000 mm Tube length: 1350 mm Cascade controller with temperature measurement in the working tube and in the oven chamber behind the tube Working tubes designed for process requirements Different gas supply packages for protective gas and vacuum operation 3-zone control for optimization of temperature distribution Burst protector for heating elements and/or as support surface for the load Stand for vertical operation 3-zone control for optimization of temperature distribution Burst protector for heating elements and/or as support for the load, Stand for vertical operation Gas collection (vacuum) tubes Along with compatible servo stabilizer and all necessary and compatible accessories	To test different biodegradable materials for producer gas production	2 sets
5.	**Portable FTIR gas analyzer** Typically set-up to measure H2, H2O, H2S, CO2, CO, NO, NO2, N2O, SO2, NH3, CH4, HCl, HF and different VOC´s. Resolution: 8 cm-1 or 4 cm-1 Scan frequency: 10 scans / s Detector: Peltier cooled MCT Source: SiC, 1550 K Beam splitter: ZnSe Window material: ZnSe Wave number range: 900 - 4 200 cm-1	To analyze the concentration of different gases in biogas, producer gas and exhaust gases	1 set

	Structure: Multi-pass, fixed path length 5.0 m Material: 100 % rhodium coated aluminum Mirrors: Fixed, protected gold coating Volume: 0.4 liters Connectors: Inlet Swagelok 6 mm Outlet Swagelok 8 mm Gaskets: Viton® O-rings Temperature: 0-750 ^{O}C Analysis software: Calcmet for Windows Portable sampling probe Heated lines Laptop PC with Calcmet TM software Power connection standard plug CEE-22 Optional analog signals in external PC: ADAM 5000/TCP module (for analog inputs, outputs, relays) Including Measurement Standards Calibration Standards and all necessary accessories		
6.	**Sieve shaker with all sieve set** Used for multi-purposes 15 sieves of different sieve opening size Timer: 1 – 99 minutes Low noise level With servo stabilizer and power supply	Used for sample preparation to analyze on different machines.	1 set
7.	**Analytical balance** Range: 0 to 500 g	Used for sample preparation for analysis on different instruments	1 set
8.	Metric combination wrench set		1 unit (32 pieces)
9.	Drive socket set complete		1 unit (99 pieces)
10.	Adjustable wrench set		1 unit (6pieces)
11.	Plier and cutter set		1 unit (12 pieces)
12.	Magnet screw driver set (different sizes)		1 unit (40 pieces)
13.	Adjustable pin spanner wrench set		1 unit (6 pieces)
14.	Pipette set (10 ml)		2 unit
15.	Gas supply pipe (plastic)		10 ft
16.	Portable welding plant		2 set
17.	Portable drilling machine Large Small		2 set
18.	Oxygen Bomb Calorimeter Working Reagents Calibrated Benzoic Acid, Nichromium wire, Crucibles		500 Tests Pack Roll Each
19.	Analytical Balance Digital Microprocessor Controlled, Capacity: 210 g, Readability: 0.1mg (0.0001g), Tare range: 210 gm, Repeatability: < + 0.1 mg, Linearity: < + 0.3 mg, Response time: 3 Second, Operating Temp: -10 to +40C, 10 – 80%RH, Draft Shield: All glass draught shield with 3 sliding doors,	Required for weighing very small amount (mg) of reagents	1
20.	Digital Heating baking plate Baking plate, temp max. 500°C	Used for the drying of films	1
21.	Hot plates with magnetic stir Temperature is up to 340°C, Integrated temperature sensor PT 1000 for precise temperature control. Control accuracy is 0.2°C, Excellent heat control accuracy at the work Plate: +1(<100°C) +1% (>100°C), Electronic speed control, max speed is 1500rpm.	Used for the organic synthesis of solar cell materials	04
22.	Overhead stirrer Stirrer for high velocity applications with low viscosity. Laboratory Stirrer with variable and constant speed range for media with viscosities up to 10.000 m Pas infinitely variable.	For syntheses and mixing of high viscosity materials	1

23.	Heating mantle 500 mL, 1000 mL Heating mantle with temperature up to maximum 400 Co	For synthesis purpose	02+02
24.	KGW Dewar vessel cylindrical Stainless steel,	For carrying out organic reactions at low temperature	03
25.	UV lamp Portable UV Lamp, 254/365nm Wavelength	For monitoring processing of a chemical reactions and check the purity of compounds on TLC.	03
26.	Class AAA Compact Solar Simulator General Specifications: Current-Voltage Measurement System IV tester, 20W version or so. All concerned software, Air mass filter Arc lamp housing, 1 arc lamp, power supply with igniter, filter holder and testing report, Vacuum Pump for Test Fixture, Interface Cables Equipment with similar or better specs will be considered Maker: US, Europe, Canada, Japan, or equivalent Options & Accessories: Compatible standard accessories Calibrated reference cell Online UPS backup Warranty with technical support Installation and training Shipment/ transportation Operating/Maintenance Manual	For testing of working solar cells	01
27.	Sonication apparatus Allows working from of 0.25 to 1 liter solution. Cooling / heating. Power 150W 230V 50/60Hz, Heating/cooling group to control circuitry with double chamber or serpentine of the extractors as previously described. 6 liter tub with circulation pump. From +100 °C to – 25 °C with digital control Usage of 200W to – 20°C, 150W to 0 °C, 2000 W for other temperatures.	Ultrasonication of sample to enhance efficiency of various physical and chemical process ,	1
28.	Rotary evaporator with all accessories including chiller With variable vacuum control, chiller and automatic lift, Temperature of outlet chilled water: 5~20˚C, Coolant R134a, Cooling capacity 500 W at 15°C, Tank volume 3 liter, pump capacity 2.5 l/min, 0.6 bar, from Germany, France, USA or Equivalent	For solvent separation, solution concentration	1
29.	Schlenk Line and Vacuum Manifolds 4-Port Vacuum Manifold, Double Bank, Airfree/Inert Line, Schlenk, Complete, cold trap, oil trap etc	The basic need for carrying out reactions at inert envirnment	02
30.	KGW Dish shaped dewar falsk Stainless steel, volume 250, 500 ml	For carrying organic synthesis reactions at low temp.	1+1
31.	Anti-Corrosion Spin Coater (8000 RPM & 6" wafer Max.) with Complete Accessories Case and spin disk made of Polypropylene (PP), Digital control box, Filter used to connect the pump and coater for preventing waste water from flowing into the pump. oil-less vacuum pump, Input Power:Default 220VAC, 50/60Hz, single phase, 1000W Max. Chamber diameter: 150 mm, 4 sets of PP anti-corrosive vacuum chucks with different sizes (Φ21mm、Φ38mm、Φ60mm, Φ100mm) Spin Speed Digital control panel with two programmable segments of different spin times and speeds 500 - 8000 RPM adjustable spinning speed at each segment. Spin Coater: 25.2cm (Φ) x 41cm(H), Lid and Bowl Liner, Digital controller: 23cm (L) x32cm(W) x16cm(H), Operation Manual.	For film making in the fabrication of solution processed solar cell	01
32.	TLC Sheets Thin layer chromatography (TLC)Aluminum sheets 20 x 20 cm	For the identification and purification of organic compounds	5 packets
33.	Refrigerator 16CFT , Lowest Temperature -10 C	For the storage of chemicals	01
34.	Electrochemical station (Potentiostate with electrodes) Delivers up to 1.0 amp. Working electrode voltages up to 25 V vs. the reference electrode. The 4-electrode cable accommodates counter, working and reference electrodes, in addition to a ground cable. Manually controlled cell voltage. Current vs. time is acquired and displayed in real time at 10 points per second. Have two auto-current ranges: 0 – 100 mA and 0 – 1 amp. The	Electrochemistry, cyclic voltammeter, potential-current curve,	01

	electrochemical instrument is specifically designed for oxide layer preparation by high-voltage anodization. Complete analytical cell kit (Teflon Cap cover 5 holes, Double Jacket cell vial, Teflon ring, Cell collar with clamp for analytical cell, Double Purge Tube, Platinum Counter electrode, Double nut for cell stand, Telescopic cell stand, Bridge tub e for 6mm diameter reference electrode, Calomel Reference Electrode		
35.	18"L Compact Three Zones Split Tube Furnace with optional Quartz Tube & Flange Double layer steel case with two cooling fans which ensure low surface temperature; Energy saving high purity fibrous alumina insulation; Two fibrous ceramic tube blocks, cooling fan in two ends for cooling flange and create larger temperature gradient. Heating elements: Fe-Cr-Al Alloy doped by Mo, Heating zone length three zones: 450 mm (18") in total Z1 - Z2 - Z3 : 152.4mm (6") + 152.4mm (6") + 152.4mm (6") +/-1ºC Constant Temperature Zone: 260 mm length Max. Temperature gradient ~100 oC/cm at central 1200°C. Fused Quartz Tube: 60 O.D x 55 I.D x 1000 L (mm), 80 O.D x 72 I.D x 1000 L (mm), Heating temperature Max. Heating Temperature: 1200°C at flowing gas Continuous Heating Temperature: 1100°C at flowing gas Max. Heating temperature at Vaccum 1000°C Max. Heating Rate: 20°C/min, Temperature Controllers .Three MTE certified Temperature controller with 30 programmable segments Built in PID Auto-Tune function with overheating & broken thermocouple protection. Over temperature protection and alarm allows for operation without attendant. +/- 1 ºC temperature accuracy. Three K type thermocouples (one for each zone). RS485 Communications Port. Vacuum Flange and Gauge: One pair of SS 304 vacuum flange with double high temperature silicone O-ring is Included ,Default flange with 1/4" Bard fittings, 1/4" tube feedthrough port (for 1/4" O.D thermocouple insert) and a KF25 vacuum port,One Vacuum/ pressure gauges. vacuum level: 10E-2 torr - 10E-5 torr	It will be used for thermolysis reactions, involving either organic or inorganic reactants. For the synthesis of superconductor.	01
36.	Dell Precision/ Any other Tower Workstation New or refurbished :Processor: Intel® Xeon® Processor E5660 (6 Cores, 12 Threads, 12M Cache, 2.80 GHz) X 2 Memory : 16GB DDR3 SDRAM at 1600MHz Hard Drive: 1 TB Serial ATA (7200 Rpm) Hard Drive Video Card : NVIDIA 256MB or Higher Power Supply: 1000W LCD: Dell 19” Keyboard : A4-Tech Mouse: A4-Tech Online UPS back up	Cluster system used for the design of organic materials for solar cells	14
37.	Gaussian software gaussian09.d.01	For the design of organic materials for solar cells	01
38.	Vacuum pump Vacuum Pump Diaphragm Oil or oil less , Max. Vacuum, 6L/min	For creating inert environment for synthesis	02
39.	Fume hood Work Area 102x67x75cm, Base cabinet Height is 62cm, the exterior size include the cabinet height, Protection class 1, Protection type IP20, Air velocity (m/s) ≥0.5m/s, ≤60dB (A), Exhaust duct PVC, standard length: 4 meters, Pipe collar 290, Pipe strap 1pc, Fluorescent lamp 21Wx1, UV lamp, Centrifugal fan, speed adjustable. The fan inside the fume hood, two layer toughened glass, 5mm thickness: motor control, height adjustable, Water tap, Water cup, Air tap, Water proof socket: 2, exterior body: cold-roll steel sheets, coated with anti-bacteria powder, interior body: adopts high grade melamine board with good acid and alkali resistance function, accessories for installation in the lab should be included, nitrogen cylinder with each fume hood	For fabrication, organic/inorganic synthesis, which produce fumes	02
40.	Liquid nitrogen container Capacity:10.0 Liters Empty Weight:6.7Kg Neck Diameter:90mm Outer Diameter:303mm Height:545mm Static Evaporation Loss Mass:0.18L/d Static Holding Time:55days Canister Outer Diameter:70 mm	For carrying liquid nitrogen,	01

	Canister Height:120mm		
41.	Nitrogen gas Cylinder Nitrogen gas cylinder with good quality material	For creating inert environment for synthesis and fabrication.	02
42.	Vacuum Oven Up to 400C, with vacuum pump	For drying at low pressure/ inert atmosphere	01
43.	Freeze dryer ALPHA 1-2 LD Plus, (Lyophilizer) Freeze dryer ALPHA 1-2 LD Plus, (Lyophilizer) standard voltage **230 V, 50 Hz**, air cooled, refrigerator 0.43 kW (1/3 HP), CFC and H-CFC-free refrigerant, without vacuum pump, bench top unit, integrated support plate for direct mounting of a drying chamber or accessories with a diameter of 240 mm, stainless steel worktop, ice condenser and ice condenser chamber with drain valve for defrosted water, ice capacity max. 2.5 kg, ice condenser performance max. 2 kg/24 h, ice condenser temperature approx. - 60°C, ice condenser chamber 3.5 litres, with hot gas defrosting, vertical lay-out, suitable for freeze drying in round flasks, wide neck filter bottles and/or on unheated shelves, also suitable as a cooling trap for the rotational-vacuum concentrator RVC, equipped with process controller LD plus (Lyo-Display-plus): Clearly arranged graphic LC-display showing the process data (ice condenser temperature, process time, section time and vacuum in combination with vacuum measuring sensor A VSP 62 MV, part no. 125478), easily operated and intuitional menu navigation in German, English and French language, conversion of temperature and vacuum according to the vapour pressure above ice, vacuum control possible in connection with pressure control valve **Part no. 101521**, **Vacuum pump** with a suction capacity of 2.25 m3/h (37.5 l/min), 230 V, 50/60 Hz, incl. Small flange connections, suitable for freeze dryers of the ALPHA-Series, vacuum hose part no. 125702 is required. **Part No. 125302** **Vacuum hose incl. standard flange** connections DN 16/25 ISO-KF for external connection of the vacuum pumps RZ-2, RC-5, MZ, 2C and MD 4C **Part No. 125702** **Base plate** for freeze dryers ALPHA 1-2 for drying inside the acrylic chambers part no. 121450 and 121455. **Part No. 120890** **3 shelves with rim** Made of aluminium, diameter 200 mm, unheated, distances between the shelves are variable, for freeze dryers ALPHA 1-2, only in combination with base plate part no. 120890 and acrylic chambers part no. 121450 and 121455 **Part No. 120893** **Acrylic chamber** diameter 240 mm, height 285 mm, to accommodate shelves and sealing devices, with 8 connections for individually controlled rubber valves part no. 121860, incl. Stoppers NS 45/40. **Part No. 121455** **Rubber valve** for connection of vessels with DIN-internal grinding NS 29/32 or distributor part no. 121870. **Part No. 121860 – 8-Nos.** Filter insert for rubber valve Part no. 121860, to avoid transportation of small dry parts to the Ice condenser chamber. **Part No. 121891** **Vacuum Sensor AVSP 62MV** Complete unit as above Christ Made in Germany or Equivalent	To get dried algal biomass	1
44.	Viscometer **Temperature range:** 15° - 100°C. **Kinematic Viscosities:**0.5-6,000* mm2/s **Dimensions**: 254 mm wide x 305 mm deep x 598 mm high (10 x 12 x 23.5") **Power Supply Dimensions:** 343 mm wide x 356 mm deep x 159 mm high (13.5 x 14 x 6.25") **Weight:** 12.5 kg (27.5 lbs) without bath fluid, Power Supply and Waste Receiver **Shipping Weight:** 51 kg (113 lbs) with all units/accessories **Operating Conditions:** 15°-30°C, 10%-90% RH non-condensing, Installation Category II, Pollution degree 2 **Fuse Rating:** 115V & 100V Units: M 250V 8A, 1-1/4 x 1/4""; 230V Unit: M 250V 4A, 1-1/4 x 1/4" **Compliance:** CE Mark: EMC directive (89/336/EEC); Low voltage directive (73/23/EEC); HI-POT (1900 VDC, 60 sec.)	To determine the kinematic viscosity of biodiesel	1
45.	Rotary Evaporator **Technical Specification: -** Hand / Motor lift Motor lift Rotation speed (rpm) 20 – 280 Rotation speed setting 3.5” LCD display Drive Brushless DC motor with electronic speed control Heating capacity (W) 1,300 Temp. range heating bath (°C) 20 – 210 Temperature range accuracy (°C) ±1 Overheat protection bath (°C) Cut-off at 5°C over set temperature	For the separation of lipid from organic solvents	1

	via separate PT 1000 Bath temperature setting 3.5" LCD display Heating bath temperature control Electronic / Digital Secondary overtemp. Cut off (°C) 250 Material heating bath (mm) Stainless steel AISI 316L Volume heating bath (I) 4.5Liers Instrument is supplied with 1Litre evaporating and Receiving flask as standard.complete unit as above, operated on 220 Volts, Model Hei-VAP Advantage ML, **Heidolph, Made in Germany** or Equivalent		
46.	pH meter Digital Bench Model Microprocessor Controlled With parallel Temperature indication, PH Range -2.0 to 20.0 ±0.005pH, PH Resolution 0.005pH, MV Range ±1200.0mV, Accuracy mV ±- 0.3mv, Automatic Temperature Compensation, Temperature Range –5 to +105.0°C, Temperature accuracy ±0.1°C with two/three Point Calibration System, Battery operated as well as operated With 220 Volts Complete with following accessories:- a) Black Electrode stand with base. b) Plastic Beaker 50 ml. c) 3MKCL Solution 50 ml. d) Calibration Standard solutions PH 4, 7 & 10 50ml each. e) PH Electrode precision Type with Built in Temperature Sensor. Complete Package Model Inolab PH 7110/Set **WTW** **Made in Germany** or Equivalent	To maintain pH for different chemical reactions	1
47.	Water bath shaker Temperature range min. 5 °C above ambient up to +95 °C with additional boiling mode (+100 °C) □ State-of-the-art control technology of the Basic and models □ Microprocessor PID-temperature controller with integratedautodiagnostic system with fault indicator □ integrated digital timer from 1 min. to 99,59 hours □ Overtemperature Protection (double) □ Interior Stainless Steel Tank & Textured Stainless Steel Casing □ Fitted With Gabled Cover **Operated on 220volts, WNB Series.** Capacity 10 Lit., interior dimension 350x210x140mm Model WNB10, Memmert Made in Germany or Equivalent	For lipid extraction	1
48.	Centrifuge machine **TABLE - TOP** **CENTRIFUGE CE ISO 9001** **, ISO 14001** MAX. RPM : 5,500 RPM MAX RCF : 5,580 XG MAX CAPACITY : 480 ML 15 ML X 32 TUBES POWER : 220V 6A 1.5 KW 50Hz **M/S VISION SCIENTIFIC** **CO.,LTD./ KOREA** or Equivalent	For harvesting of algae	1
49.	Ultrasonic transducer horn Digital ultrasonic horn (Branson 450) made up of a titanium alloy with a tuner that allows working with a variable amplitude and duty cycle. The device also includes a thermostated water bath. Both the horn and the water bath are included into a soundproof chamber (Branson Ultrasonic Corporation (Danbury, Connecticut, USA) or Equivalent	For Trans esterification reaction	1
50.	Hot Plate with Magnetic Stirrer Temperature range up to 370°C, Variable Speed Control upto 1200rpm Heating Plate Ø: 155mm, Stirring capacity: 15 liter Power: 630 Watt, with PTFE follower, operated on 220 volts, Model ARE Velp, Made in Italy or Equivalent	For biodiesel production process	2
51.	Small Scale Biodiesel Unit Capacity 50 L Company: Globecore or Equivalent Minimum mixer throughput, feedstock, liters per minute 10 Minimum methanol and catalyst solution consumption, liters per minute 0.1-0.3 Minimum oil tank volume, liters 50 Minimum methanol/KOH solution tank volume, liters 12 Minimum finished product tank volume, liters 30 Oil heating temperature, degree Centigrade 40-70 Maximum power, kW 10.5 Power supply voltage at 50Hz, V 3 ~ 400 Control circuit voltage, V 220 Dimensions, mm	For Biodiesel production from animal fats and vegetable oil	1

	– length 1200 – width 700 – height 1600 Max dry weight, kg 460		
52.	Gas Chromatograph General Description: Four level, three ramp temperature programming to 450°C (Oven Maximum software controller) Five method set-up, generation, storage, and copy. Up to two simultaneous analog outputs for integrator or recorder, switch cable to either detector. Digital electronic pressure readout with capillary injections. Up to six solenoid valves for split vent and gas sampling valve control. Features: • Up to 32-programmable timed events. External computer communications allows full instrument • Control plus two simultaneous channels of raw data. Battery RAM storage of GC methods, instrument configuration, and automation programs. • Capillary column injector (front). • CH B (Back) capillary column Injector. • Operating Temperature: 50°C to 450 °C in 1°C increments • Flow Controller: Programmable Pneumatic Control PPC (Electronic) • Accessories: As per manufacturer standard. • Thermal Conductivity Detector (TCD), (REAR). Total chrom Work Station Software Kit & dotLINK Integral LINK.	For gas analysis	01
53.	Power supply for Gel Electrophoresis Compact, space saving & light weight design, touch panel, audible & visible alarm, status alarm, constant voltage or current, safety features includes, no load detection, over voltage protection, automatic recovery after power failure, dimension 320x240x73mm, digital voltage range 10 – 300V in 1 Volt step, current 4–400 mA in 1mA steps 75 Watt max, design 4 parallel outputs, with timer control 0–999minute, operated on 220 Volts, Model Elite 300, Wealtec USA or Equivalent		01
54.	Anaerobic digester (Transparent) F30100020 DK8 Digester 230V/50-60HzDK8 Digestore 230V/50-60Hz Manufacturer / or Supplier : Velp / Italy or Equivalent	Cultivation of phototrophes for anaerobic digestion.	01
55.	Microscope (Binocular) Optika Italy 7 0.408.836 M-300/34 Trinocular microscope with halogen lamp and Infinitive Semi-plan Achromatic Objectives 4x, 10×, 40x, and 100x set 1 7.1 0.408.836*** Digital Camera with adapters set 1 Manufacturer / or Supplier : SCO-ENG / Germany or Equivalent	For microbes visualization/examination.	01
56.	Micropipette Mechanical Pipette-SCOpette P Autoclavable, Single-channel Adjustable Volume 8.1 0.382.013 SCOpette P volume 0.1-2.5µl pc 1 8.2 0.382.014 SCOpette P volume 0.5-10µl pc 1 8.3 0.382.015 SCOpette P volume 2-20µl pc 1 8.4 0.382.016 SCOpette P volume 5-50µl pc 1 8.5 0.382.017 SCOpette P volume 10-100µl pc 1 8.6 0.382.018 SCOpette P volume 20-200µl pc 1 8.7 0.382.019 SCOpette P volume 50-200µl pc 1 8.8 0.382.020 SCOpette P volume 100-1000µl pc 1. 8.9 0.382.021 SCOpette P volume 200-1000µl pc 1 8.10 0.382.022 SCOpette P volume 1000-5000µl pc 1 Manufacturer / or Supplier : SCO-ENG / Germany or Equivalent	For measuring precise volume of reagents/media	Complete range (10)
57.	Shaking Water Bath 43 1083 Shaking Water Bath General Description: Type GFL 1083 with reciprocating motion, capacity approx. 28 Ltr., digital temperature display, for max. 10 flasks of 500 ml capacity with tray 3960 and Flask clamp 3988 (tray and flask	For shaking of culture media.	01

	clamps not included!); Features: Temperature Range from 5°C above ambient up to 80.0°C, Temp. constancy ±0.5 K, mechanical temp. control (capillary thermostat); over temperature cut-out, Shaking frequency 10...250 rpm stepless adjustable, stroke length: 22 mm, stainless steel bath interior/shaking mechanism/lid and heating element, electrolytically galvanised steel sheet casing; Dimensions: 712x500x330 mm, 230V - 50/60 Hz, ca. 44 kg. 43.1 99999 Cover - Separat zu 1083 als Ersatzteil 43.2 1910 ProAqua Top 1 bottle for 200 ml 43.3 3920 Test tube tray, for 243 tubes, 160x 16/17 mm dia./ 100x 16/17 mm dia. 43.4 3921 Test tube tray, for max. 63 tubes dia. 31 mm 43.5 3922 Test tube tray, for max. 372 tubes, 100x12mm or 75x 12 mm (L x dia)		
58.	Vortex 45 9008200 TTS 2 IKA yellowline Test Tube Shaker 230V 50/60 Hz or Equivalent complete package with: MS 1.31 Test tube insert, 14 holes, diam. 8 mm incl. MS 1.32 Test tube insert, 6 holes, diam. 10 mm incl. MS 1.33 Test tube insert, 4 holes, diam. 15 mm incl. MS 1.34 Test tube insert, with no pre-drilled holes, incl. Supplier Manufacturer / Origin : IKA / Germany or Equivalent	For cells disruption.	01
59.	Radiometer Yellow–Springs–Kettering model 6.5-A radiometer through a Corning 7–69, 620- to 110-nm filter.	For light intensity measurement for phototrophes	01
60.	Digital multimeter Digital multimeter (DMM PCI-4070; National Instruments, Austin, TX, USA) or Equivalent	For measurement of electric current/ voltage	01
61.	Water Ultra purification System Bench top/Wall Mounted system for ultrapure lab water with output 2 L/min , EC 0.055µS/cm, Resistivity 18.2MΩ-cm Touch Screen LCD, TOC 1-5 ppb, DNase / RNAse Free Bacteria < 1 CFU/ml, Endotoxins < 0.001 EU/ml, Particles> 0.1µm < 1, Built in Conductivity, Dual Wavelength UV Lamp, Sterile Filter 0.2 µm, Power Supply 220-240VAC-50Hz. complete with Pre-Treatment Feed Water RO System 150 gallons capacity per day.	For ultrapure lab water	01
62.	**Herb Grinder** **Make: PRC** Or Equivalent Hi speed 24000 rpm grinding mill for plant material of sample capacity 200 grams or above. Power 220VAC-50Hz	This is important equipment to chop the fresh sample for biogas analyses	1
63.	**Bio-Reactor Simulator** **Make: Sweden** Or Equivalent The AMPTS II is a valuable system for conducting anaerobic biodegradability, methane potential and specific methanogenic activity (SMA) tests, allowing for the standardization of measurement procedures, data interpretation and reports. This allows users to determine the true dynamic degradation profile of any substrate, but also to find out the optimum mix of substrates for co-digesting, screen proper pre-treatment methods, and evaluate the need for additives. Including compatible servo motor stabilizer and compatible online UPS	Bio-reactor Simulator is crucial equipment that will be used to determine the biogas yield by anaerobic digestion and methane yield	1
64.	**Plant Canopy Analyzer** **Make: USA** Or Equivalent Handy model battery operated for direct readings of PAR & Leaf Area Index. LCD display. Big data storage capacity. Complete package including Probe, Software, Sensor, tripod and carrying case.	It is necessary equipment that measure the leaf area index of the energy crops which is important growth parameter	1
65.	**NIR Analyzer** **Make: USA** Or Equivalent Benchtop NIR Forage Analyzer is for Grasses, Hays, Legumes and Grain to measure Dry Matter, Protein, Crude Fiber, Ash, Sugar, NDF, ADF, ADL, Dry Matter Digestibility, and Other Parameters in 30 Seconds. Re-dispersive scanning monochromator with nominal bandwidth of 10 nm (FWHM). Tungsten halogen lamp light source with MTBF rating of 10,000 hours (User changeable). Data Interval1.0 nm. Custom dual cooled, extended InGaAs detectors. Wavelength 1100 - 2500 nm; 680 - 2500 nm (optional). Analyzer must complete with calibration package for dried grass, hay, legume and grain	Biogas yield and methane yield is always mainly based on chemical composition. NIR analyzer is very important instrument that give chemical composition of the biomass for bio-energy production	1

	forages, both ensiled and fresh. A comprehensive list of constituents is predicted including instant access to a complete nutritional profile for all your forages. Complete built in computer. Including compatible servo motor stabilizer and compatible online UPS.		
66.	**Electric Plateform Balance** **Make: UK** Or Equivalent Digital balance capacity 300kg with readability 100 grams. Steel Platform size 90x60 cm. Full Tare & different weighing units. RS-232 port with printer. Battery operated/DC power supply.	Electric platform will be used to weigh larger biomass samples in the field to calculate total biomass and biomass distribution of the energy crops	1
67.	**Digital Laboratory. Balance** **Make: UK** Or Equivalent Digital balance capacity 220 grams with readability 0.1mg. Full Tare & different weighing units. Pan size 90 mm. RS-232 ports with PC software. Glass hood & solid Aluminum body. complete with stabilizer & weighing boats	Lab. balance will be used to weigh the samples in the lab. on small scale.	1
68.	**Plant/Wood Chipper cum Shredder** Capacity 500 kg/hr. power 220 V AC-50 Hz	To cut the whole plant in small pieces for grinding	1
69.	**Digital Analytical balance** Capacity 220g / Readability 0.1mg. Pan size ϕ 90 mm. Full Tare, Glass chamber & Aluminum Body. Electrical Supply 220VAC. Unit conversion facility. Complete with data software.		01
70.	**Digital Incubator** Single door with capacity 250 liter. Temperature range +5 to 65 ^{O}C. Single doors with lock & key. Humidity 40-95% by ultrasonic system. Digital programmable Microprocessor controlled. 7 inches Touch screen. Electrical Power 220VAC-50Hz with compatible Stabilizer including compatible servo motor Stabilizer + compatible UPS		02
71.	**Vortex Mixer** Mixing Speed: 300 to 3,000 rpm with timing 15 s to 99h59min / continuous. complete with 96x0.2ml PCR Tube Holder 24x0.5ml Tube Holder, 24x1.5/2.0ml Tube Holder, 8x15ml Tube Holder, 3x50ml Tube Holder. Electrical Power 220VAC-50Hz.		01
72.	**Ice Flake Machine** Daily production 20 kg. Storage capacity 10 kg. CFC-free/134a. With safety alarm of water shortage & bin full. Electrical Power 220VAC-50Hz.		01
73.	**Digital Water Bath** Capacity 9 liters or above. + 4 to 100^{o}C temperature with shaking speed up to 150rpm. Electrical Power 220VAC-50Hz. Interior material stainless steel with lid. Digital Microprocessor controlled with LED display. Complete with universal spring platform & SS rack for holding microtubes.		01
74.	**Vertical Rotary Evaporator** Speed 20-280 rpm with digital control. Movement by DC brushless motor. water bath temperature . Glassware lifting by motor. Water bath temperature RT+ to 180^{o}C with capacity 5 liters. Stoke 150mm. Microprocessor controlled with LED display. Electrical Power 220VAC-50Hz. complete with evaporating flask 500ml & 2000ml & receiving flask 500ml & 2000ml with compatible connector. Acid resistance acid vacuum pump with vacuum controller & circulating chiller.		01
75.	**Soxhlet Apparatus** 3 places heat system with temperature controller. Range up to 250^{o}C. Complete with clamp & glass		01

	assembly of 500 ml & 1000 ml. Electrical Power 220VAC-50Hz.		
76.	**Upright -80 Freezer** Capacity 330 liters. Temperature range -10 to 80 oC with digital display. With Audiovisual safety Alarms. Door with look & key. Electrical Power 220VAC-50Hz. Complete with voltage stabilizer, including compatible servo motor Stabilizer + compatible UPS.		01
77.	**Gel doc EZ system** Gel Images Flatbed Scanner, CCD Image Sensor. Resolution Optical: 3200 dpi (7.9 um spot size, 63 lp/mm), Hardware: Up to 3200 x 6400 dpi, Default: 300 dpi, Light Source LED Scanning Area Reflective: 11.6" x 16.9" (294.6 x 429.3 mm / A3) Transparent: 11.6" x 16" (294.6 x 407.9 mm), Scanning Speed 4.9sec./20.16 sec.(Scanning Time/Total Time Including Calibration):10x10cm,300 dpi11.7sec./27.06 sec.(Scanning Time/Total Time Including calibration):24x24 cm,300 dpi 19.57sec./34.96 sec.(Scanning Time/Total Time Including Calibration):11.6”x16".Dynamic Range Transparency: 0.05D ~ 3.77D, Bit Depth Input: 48-bit color, 16-bit grayscale, Output: 24-bit color, 8-bit grayscale Connectivity Hi-Speed USB (USB 2.0), Power adaptor Gel trays 110 x 110 mm (2 sets), 240x240 mm (1 set), 12"x16"(1 set). Complete with 1D analysis Software including compatible servo motor Stabilizer + compatible UPS		01
78.	**Microscope** 7 0.408.836 M-300/34 Trinocular microscope with halogen lamp and Infinitive Semi-plan Achromatic Objectives 4x, 10×, 40x, and 100x set 17.1 0.408.836*** Digital Camera with adapters set 1 Manufacturer / or Supplier: SCO-ENG / Germany or Equivalent		01
79.	**Bio-Pad composter** Assembled Dimensions: 26.5-Inch long x 15.5-Inch wide x 16-Inch Tall. Usage Food scrap recycling Raising soldier grubs Digestion of pet waste. Dual migration ramps for auto-harvesting into collection bucket. Drainage pad / plate allows liquids to passively seep into liquid catchment area. Top lip barrier helps prevent grub escape while increasing the surface for egg laying.		01
80.	Transient plane source (TPS) sensor Radius = 6.4 mm With Kapton insulation and a cable	It is used in Thermal Constant Analyzer that is already in our lab. This machine uses different sensor sizes depending on the size of sample. This sensor is required to measure thermal transport properties of biomass and biochar in pellet form.	01
81.	Pt-100 thermometer Temperature range=-40 to +400 ^{0}C	It will be used to measure the exact temperature of specimen during thermal properties measurements. Moreover, it will be used to calibrate the furnace.	01

82.	Hydraulic press with a set of dies Maximum load= 20 tones Pellet size= 1 inch (square) Radius= 30 mm	It will be used to form pellets from biomass and biochar to determine the effect of density on thermal properties.	01
83.	EC meter-Bench top EC range: 0 to 199.9µS/cm Temperature compensation: -10 to 120 ^{0}C	Ionic conductivity measurements of biodiesel/ bio oil will indicate the overall concentration of different ions mixtures i.e. Na, K, Cl etc. in the final product	01
84.	Data acquisition unit Labjack U12 Resolution= 12bit inputs=8 Output=2	To check the stability of an apparatus by measuring and storing the voltages across the different electrical components of an instrument	01
85.	Chloride meter Volume range: 50µl Measuring Range: 5-999 mmol/l. Accuracy error: 0.4 mmol/l or 1%. Precision error: 0.1mmol/l 100>c>10mmol/l, 1mmol/l 999>c>100mmol/l. Power supply: 220V, 50/60 Hz.	The presence of Cl ions in liquid bio-fuel/biodiesel can severely corrode the metallic components of pyrolysis plant as well the bio-fuel storage tank. Therefore, it is necessary to determine the Cl content in solid biomass and biofuels. If the concentration of Cl ions exceeds its safe limit then the biomass can be washed/cleaned before using in the reactor	01
86.	Vacuum pump Max. pumping speed at 50/60Hz =m³/h 0.7/0.85 Ultimate vacuum=mbar 100	The porosity of a material has a direct effect on its thermal properties i.e. thermal conductivity and diffusivity. The porosity of biomass briquettes/ biochar can be estimated by comparing its mass differences in dry and fully saturated state. Knowledge of porosity and moisture content is essential to optimize fuel production by pyrolysis	01
87.	Glass desiccators Diameter=6”	It is required to keep the samples in dry state and avoid its interactions with the environment.	02
88.	Gilson pipits a)Measuring Range 1 to 10µl, Accuracy ±0.040µl, b) Measuring Range 100 to 1000µl, Accuracy ±1.5µl	For the preparation of standard samples/solutions for chloride meter and flame photometer and for dilution of extracts	01+01=02
89.	Vortex mixer Electronic speed regulation 0 – 3000 rpm Vibration orbit 4.5 mm,	To homogeneously mix an experimental sample and a dilutant for pH, EC, ionic (i.e. Na, K, Cl etc.) content measurements	01

Section VIII.

Sample Forms

Sample Forms

1. Bid Form and Price Schedules

Date: _____
Tender No. _____

To:

Director,
Punjab Bio-energy Institute (PBI),
University of Agriculture,
Faisalabad.

Gentlemen and/or Ladies:

Having examined the bidding documents including Tender No.130/2015, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to supply and deliver *[description of goods and services]*in conformity with the said bidding documents for the sum of *[total bid amount in words and figures]*or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Bid. We understand that failure to furnish all information required by the bidding documents or to submit a bid not substantially responsive to the bidding documents in every respect will be at our risk and may result in the rejection of its bid.

If our bid is accepted, we undertake to provide a performance security in the form, in the amounts, and within the times specified in the bidding documents and to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements. Failure to which, the Purchaser reserve the right to take action as per provisions of the bidding documents.

We agree to abide by this Bid for the Bid Validity Period specified in Clause 16.1 of the Bid Data Sheet and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and address of agent	Amount and Currency	Purpose of Commission or gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none")

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.
We understand that you are not bound to accept the lowest or any bid you may receive.

We certify/confirm that we comply with all requirements as per ITB Clause 2 of the bidding documents.

Dated this _____ day of _____ 19_____.

_____ _____
[signature] *[in the capacity of]*

Duly authorized to sign Bid for and on behalf of _____

Price Schedule for Goods Offered from within the Purchaser's Country

(ITB clause 11.2 (a & b)

11.2 (a): FOR

11.2 (b): FIS Plus

Name of Bidder _____.Tender Number ____.Page _ of ___.

1	2	3	4	5	6
Item	Description	Country of origin	Quantity	Price with out Sales Tax	Price With Sales Tax

Signature of Bidder _____

Note: In case of discrepancy between unit price and total, the unit price shall prevail.

Manufacturer's/Distributor's/Dealer's Certificate Form

[See Clause 13.3 (a) of the Instructions to Bidders.]

To: *[name of the Purchaser]*

WHEREAS *[name of the* Manufacturer/Distributor/Dealer*]* who are established and reputable Manufacturer/Distributor/Dealer of *[name and/or description of the goods]* having factories/Warehouse/trading house at *[address of factory]*

do hereby authorize *[name and address of Agent]* to submit a bid, and subsequently negotiate and sign the Contract with you against Tender No. *[reference of the Invitation to Bid]* for the above goods manufactured by us.

We hereby extend our full guarantee and warranty as per Clause 15 of the General Conditions of Contract for the goods offered for supply by the above firm against this Invitation for Bids.

_____

[signature for and on behalf of Manufacturer]

Note: This letter of authority should be on the letterhead of the Manufacturer/Distributor/Dealer and should be signed by a person competent and having the power of attorney to bind the Manufacturer. It should be included by the Bidder in its bid.